PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No. 1. TORONTO, CANADA, JANUARY, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS;

PUBLISHED MONTHLY IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

C. H. MORTIMER, Publisher,

King Street West, - TORONTO, CAN.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address Canada or the United States for $2.00 per year. The price to subbers in foreign countries, is $2.50. Subscriptions are payable in ance. The paper will be discontinued at expiration of term paid for, stipulated by the subscriber; but where no such understanding exists, ill be continued until instructions to discontinue are received and all arages are paid.

ordering change of address give the old as well as the new address. lure to receive the paper promptly should be reported to this office.

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rices for advertising sent promptly on application. Orders for rtising should reach the office of publication not later than the 12th of the month, and changes of advertisements not later than the 5th of the month.

EDITOR'S ANNOUNCEMENTS.

ntributions of technical value to the persons in whose interests this al is published, are cordially invited, and if found to be of sufficient will be paid for. Subscribers are also requested to forward paper clippings or written items of interest from their respective ities.

SALUTATORY.

THE rapid improvement in methods and materials of construction, in decorative art, and in sanitary iances, which has marked the history of the last ten s in Canada, and the field of usefulness which seems e open to a printed medium of information and munication between the thousands of persons interl in such subjects, has led to the publication of this, irst number of THE CANADIAN ARCHITECT AND DER.

hile great improvement has taken place, the opment along this line may be said to have only commenced. The advance in civilization and h is creating the demand for a better class of public private buildings than those adapted to more tive times. It is a pleasing fact that the skill of chitects, sanitary engineers and artificers is respondo this demand, and the pleasing results are aing to be observable on every hand.

ther parts of the construction field—in the building ements, sewers, bridges, canals, etc., improvements terials and the methods of using them are not asily discernible. Had there existed a journal d to this important field of knowledge, the extent e improvements, the causes which have led up n, and the means employed to carry them out, doubtless be more generally understood. The publisher of THE CANADIAN ARCHITECT AND BUILDER believes the time has arrived when a journal aiming to fulfil such a purpose, will prove a useful addition to the technical literature of the country, and assist in bringing about many needed reforms. The encouragement bestowed upon this enterprise thus far, seems to justify that opinion.

The scope of this journal is to a large extent indicated by the present number. In the matter of its contents, the reader will allow for the fact that perfection in any line of endeavor is not attained as the result of first efforts, but is the reward of a determination to succeed, coupled with persevering industry. With the assistance of a corps of regular contributors, embracing men of well-known ability in the fields of architecture, engineering, construction, decoration, sanitation, etc., every effort will be made to render the contents of each number of this journal increasingly valuable. From all the principal cities correspondents will supply contractors and others interested with reliable information concerning what is being done and what is intended to be done in construction work in their respective localities.

THE CANADIAN ARCHITECT AND BUILDER is designed also to be a journal of Public Works, and a medium of communication between architects or municipal or other corporations who may desire to receive tenders for construction works of any kind, and contractors and builders prepared to undertake such works.

Realizing how largely the public health depends upon proper conformity on the part of householders and house-builders to the requirements of sanitary laws, we shall do what we can to eradicate wrong notions and inculcate right ideas and practices in regard to that subject.

The value of illustrations in a paper of this class is fully understood, and to this department careful attention will be paid. We shall feel obliged to any one who will send us for publication drawings of a character likely to prove interesting and instructive to our readers. Friends who may desire to thus assist us, will please note that drawings should be made with pen and black ink on white paper or cardboard. In the case of architects, we shall be pleased if they will loan us original drawings which can be photographed down to the required size for engraving.

To the many persons who have encouraged us in our venture by the bestowal of advertising favors, by giving us their names as subscribers, by promises of future support, and by contributing of their experience to the columns of this initial number, we extend our sincere thanks.

In conclusion we tender to every reader the wish for a happy and prosperous new year, with the hope that before its close a permanent and mutually beneficial acquaintanceship shall have been established between this journal and that particular portion of the public whose interests it seeks to promote.

A PROPOSITION has been made to add an architectural department to the curriculum of the School of Practical Science in this city. The government should deal more liberally by this institution, so that lack of necessary funds may not stand in the way of carrying out such a desirable suggestion.

IN cases where contractors' deposits, accompanying their tenders for public works, are held by the city for any considerable length of time, as is frequently the case, the Toronto City Council has decided to allow interest on such deposits. This seems to be only just to the contractors, some of whom have had money locked up in this way for a year.

ONE of the most difficult problems which any young man is called upon to decide is the choice of the business or profession to which he will devote the energies of his life, and in which he hopes to attain eminence. Looking out over the fields of activity, he sees nearly all of them filled to overflowing with workers, and in some of them men are seeking employment without being able to find an opening for their labor. Under circumstances like these, it is gratifying to learn that there is still plenty of room in the architectural and engineering professions for young men of ability and ambition.

THE CANADIAN ARCHITECT AND BUILDER would suggest to the Builders' Association of Toronto, the advisability of erecting a building designed for the use of the Association and for architects' offices. In Boston, Philadelphia, and other American cities, where such buildings have been erected, their utility and success as a business speculation are universally acknowledged. The intimate business relations between architects and builders makes apparent the advantage of having them located in one building as compared with the present state of things, under which a vast amount of valuable time is wasted in running to and fro between a large number of offices situated in various parts of the city.

A TORONTO architect recently remarked that the CANADIAN ARCHITECT AND BUILDER would prove very useful to the members of the profession by supplying them with the names and addresses of manufacturers and dealers in builders' materials. Hitherto, he said, the want of this information had been very much felt. "We know all about English and American supply men through the architectural journals of those countries," said he, "but while we know also that there are plenty of such dealers in Canada, and even here in Toronto, we have had no way of finding them out except to go out and search for them, and that takes too much time. On the other hand, a great deal of inconvenience and delay is experienced in dealing with English or American firms." Thus it appears that our advertising columns, as well as the contents of our reading pages, are likely to serve a useful purpose, and add interest to this new venture.

THE annual report of the Medical Health Officer for the city of Toronto, presented a few days ago to the Local Board of Health, should lead to immediate steps being taken to improve the sanitary condition of the city. The increasing prevalence of infectious diseases, due no doubt to increase of population and inadequate sanitary provisions, is truly alarming. For

example, the deaths from diphtheria in 1885 were only 64 as compared with 202 in 1887. Perhaps if these figures had been published a little earlier, the citizens would not have voted down the by-law to provide money for the construction of a trunk sewer. It is to be hoped the incoming Council will present to the citizens at an early day a fully considered scheme for disposing of the city sewage. As suggested by the Medical Health Officer, the time has also arrived when the Council should order the filling up of all privy pits and wells, at least within the thickly-populated portions of the city, and prohibit kitchen slops and refuse to be thrown into back yards, there to exhale poisonous disease germs. Careful attention to these matters and to the purity of the water supply would, we believe, greatly lessen the prevalence of infectious diseases.

AN investigation of the records indicates that there was expended in new buildings in Toronto last year about $1,250,000. This is something like $100,000 less than in 1886, a fact due to the prolonged strike on the part of workingmen engaged in the building trades last summer. The most important of the building permits issued during the year are recorded on another page of this paper. The fact that permits are only required from persons building within the fire limits, and that many persons within said limits evade the regulation requiring permits to be obtained, will show that a large proportion of the building done is not indicated in the record. As shown by our correspondent's letter, Montreal expended in 1887, about $4,000,000 in the construction of 1100 new buildings. The extent of operations in other cities and towns is indicated under the heading "The Record of 1887," and shows a satisfactory rate of progress. Advices to hand seem to indicate that building operations during the year 1888 will be brisk, especially in this city and in Montreal, where a number of public and other large buildings are to be commenced. We trust that common-sense methods will be adopted by employers and employees to settle the hours of labor and rate of wages, so that the strikes which have resulted so disastrously in past years may not be repeated.

SOME people are very proud of what they are pleased to call their democratic principles. Unfortunately it sometimes happens that in their anxiety to be thought democratic, they show an entire disregard of the recognized canons of good taste. The other day, for example, a writer in a Toronto daily paper related a remark which a young lady was overheard to make, to the effect that it was a pity that a long row of houses—every one alike—should have been built on St. George street, as they were out of harmony with the tastefully-designed residences and handsome lawns which make that such a delightful thoroughfare. Satisfaction was expressed by this democratic writer with the action of the "enterprising builder," who put up the houses and contempt for the "aristocratic notions" of the young lady. As a matter of fact, the remark made by the latter was one that might naturally be expected to fall from the lips of any person possessing even in a limited degree the ability to decide between beauty and deformity. The fact is that the "enterprising builder" has been allowed to follow too much his own sweet will in the building up of this city. The result of his operations appears in row after row and street after street of houses, all apparently constructed after the one design, and exhibiting to the beholder a uniformity that is monotonous and extremely uninteresting. This does not apply to the more expensive class of houses built during the last five years, which display a variety of design which is in pleasing contrast to those we have been speaking about. It is to be hoped that the departure from the old steretyped methods and designs which has already commenced, will mark the future growth of the city, and that, even at the danger of exposing himself to the contempt of the man of democratic ideas, the "enterprising builder" will fall into line with the march of improvement and the dictates of good taste.

FROM small beginnings and under disadvantages and rebuffs all great reforms seem to flourish most satisfactorily. A few years ago a number of gentlemen whose profession led them to be deeply interested in questions affecting public health, formed an association for the study of sanitary questions and the spread of sanitary doctrines. For some time the association was successfully carried on, and much interest taken in its proceedings. Last year, from some unaccountable reason, it collapsed suddenly. This is a matter of sincere regret. However, it left a legacy behind it, in the form of a draft of a Health Act, and more particularly of a Plumbing By-law for the city which has since been adopted by the City Council, and one of its chief recommendations has been carried out in the appointment of two inspectors of plumbing. It is gratifying to learn that at the examinations held, the candidates presented papers of great excellence, showing much study and thought on the prime questions of health. Thanks to the energy and determination of the chairman of the Local Board of Health, we are now embarked on a system of thorough inspection of all plumbing, and the inauguration of the greatly-needed measures which will tend to promote the healthiness of the citizens and protect their lives, more than fresh air in open parks. Although the by-law has been enforced for a few weeks only, the change is marked already. No prosecutions have yet been necessary to cause architects or plumbers to fall into line, and we are very pleased to learn that firms who are occupying the first places in the profession are fully in accord with the spirit of the by-law. The point at which the shoe will pinch is not in the upper class of work, but in the house "with all modern improvements." We do not desire to interfere with the enterprise which is building up our city so rapidly, but we wish to point out as a duty from which we will never shrink, that the person who introduces plumbing into a house, and the workman who contracts to put it in, hold the lives of their fellow citizens in their hands and exercise an influence which no physician pretends to do. It is in the houses of our artisans where the greatest evils occur. Builders, speculative or otherwise, must be brought to learn that it is their duty to construct houses with such safeguards from sewer air and other mephitic vapors that the health of the inmates shall not be endangered. It is a gross injustice for those who know how dangerous the entrance of sewer air is to the health of the inmates to cover up joints with putty, slip clay pipes together merely cementing the upper part of the joint, or supply cast iron pipes of the thinnest calibre. Far better to have only a sink properly arranged, than "all modern improvements" which are a snare and delusion, source of bad health, and the cause of death.

BRIDGE INSPECTION IN CANADA.

AN apology is scarcely needed for making this the subject of the first article on engineering topics in this new journal; as none who has read the news of travel for the last quarter of a century or less will deny its vital importance, from the fact that, of all accidents to travellers on land, the most appalling and fatal beyond all controversy have been bridge accidents.

Mr. Telford, the father of the engineering profession in England, when seeking from George IV. a charter for the Institute of Civil Engineers, defined engineering to be "the art of adapting all the forces in nature to the use and benefit of man," and a pursuer of this art who, when the above department of the profession comes within his province, does not, by giving it his most skillful attention; aid in bringing into use the safest and best-tried patterns, is culpably untrue to so noble a standard; and those whose part it is to scrutinize the engineers' work are even more guilty if they do not require a full and intelligent conformity to the same.

Without intending to seat ourselves unfittingly in the place of judgment, we think that we can prove the pressing need existing for a marked change in the system of inspection of bridges by the Canadian Government. In the first instance, personal experience shows that the oversight of bridges by Dominion engineers during their erection is not invariable; and after erection, the tests used by them are not as crucial as the urgent claims of the case call for. Secondly, that this is becoming a real and felt want in the States where bridges are generally the same pattern as those in Canada, is plain from a communication read by Mr. Willard S. Pope, President and Engineer of the Detroit Bridge Company, before the American Society of Civil Engineers, who have been lately considering it. He strongly urges the appointment of a Government commission, headed by an engineer of the highest skill and integrity, without conformity to whose standards the building of no bridge should be begun; without whose examination, none should be carried forward or opened for traffic; and whose officers should inspect all bridges annually. Thirdly, in Great Britain, except in the matter of annual inspection, all the above ground is *more* than covered, it being a *sine qua non* that, besides drawings of all bridges, full descriptions of every class must be deposited with the Government before railways, etc., are begun. Its officials make periodical inspections of same during erection, and, prior to traffic, exhaustive tests.

It may, therefore, be confidently expected that a Government so forward in keeping pace with the march of pressing progress as that of the Dominion will not be behind in this instance.

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USEFUL INFORMATION

What ought to be a very durable paint has been made of a very finely powdered zinc, mixed with oil and sicative. A varnish is thus produced which may be applied with a brush in the ordinary way.

A brilliant black varnish for iron, stone, wood or concrete can be made by stirring up ivory black in ordinary shellac varnish. It ought to be applied to the surface when the article to be coated is cold.

TO CLEAN MARBLE.—The following process is recommended: Wash the surface with a mixture of finely powdered pumice stone and vinegar, and leave it for several hours, then brush it hard and wash it clean. When dry, rub with whiting and wash-leather. Oxalic and muriatic acids are also used, but they will injure the polish of the marble.

A brick, says a technical contemporary, being about as porous as a lump of sugar, and having six sides, needs a careful filling for water-tight work in cess-pools, etc., and a thin grout or porridge of cement is commonly used. Heating the brick and soaking beforehand in thick coal-tar has been recommended. A man may lay common wall all his life without learning how to make brick water-tight.

DURABILITY OF WOODS.—In some tests made with small squares of various woods buried an inch in the ground, the following results were noted: Birch and aspen decayed in three years; willow and horse chestnut in four years; maple and red beech in five years; elm, ash, hornbeam and Lombardy poplar in seven years; oak, Scotch fir, Weymouth pine and silver fir decayed to a depth of half an inch in seven years; larch, juniper and arbor-vitæ were uninjured at the expiration of the seven years.

TO MAKE CAST BRASS HARD AND DUCTILE.—It is said that 2 per cent by weight of finely pounded bottle glass placed at the bottom of the crucible in which red brass is being melted for castings gives great hardness and at the same time ductility to the metal. Porous castings are said to be almost an impossibility when this is done, and the product is likely to be of great service in parts of machinery subject to strain. An addition of 1 per cent of oxide of manganese facilitates working in the lathe and elsewhere where great hardness might be an objection.

BROWN STAIN FOR WOOD.—A brown stain for wood for the imitation of oak, walnut and cherry tree wood is obtained by thinning ordinary tincture of fodine with alcohol, more or less being added of the latter according as a lighter or darker shade of brown is desired. The stain should be applied with a broad brush or rag. After it has dried, the work should be polished. It is possible, however, to dispense with ordinary French polish by adding white shellac to the stain. One or other of these processes of polishing is indispensable to give permanency of stain.

PLASTER FOR MOULDINGS.—Where walls and ceilings are to be moulded whilst yet in a plastic state, some decorators are using a fibrous plaster with the object of securing greater firmness and tenacity. The idea itself is not new, animal hairs having formerly been intermixed with lime, but this is a new application. In England and France a fine wire netting is at times inserted between two courses of plaster, to afford greater firmness in holding plaster frames. The tenacity of some of the old mouldings in old New York houses, whilome aristocratic, is very remarkable, retaining as they do their original sharpness of outline.

GIVING STEEL A LUSTRELESS POLISH.—A finely polished, lustreless surface on tempered steel can be procured by either of the following operations: After the steel article has been tempered it should be rubbed on a smooth iron surface with some pulverized oil-stone until it is perfectly smooth and even, then laid upon a sheet of white paper and rubbed back and forth until it acquires a fine, dead polish. Any screw holes or depressions in the steel must be cleaned and polished beforehand with a piece of wood and oil-stone. This delicate, lustreless surface is quite sensitive and should be rinsed with pure soft water only. A more durable polish is obtained by first smoothing the steel surface with an iron polisher and some powdered oil-stone, carefully washing and rinsing. Then mix in a small vessel some fresh oil and powdered oil-stone, dip into this mixture the end of a piece of elder pith and polish the steel surface with a gentle pressure, cutting off the end of the pith as it commences to become soiled. In conclusion it should be thoroughly cleansed in soft water, when the article will be found to have a fine, lustreless polish.

HOW TO MAKE LIGHTNING RODS EFFECTIVE.—Prof. Tyndall, in a letter on lightning conductors, points out that the abolition of resistance is absolutely necessary in connecting a lightning conductor with the earth, and this is done by closely embedding in the earth a plate of good conducting material and of large area. The largeness of area makes atonement for the imperfect conductivity of earth. The plate, in fact, constitutes a wide door through which the electricity passes freely into the earth, its disrupting and damaging effects being thereby avoided. A common way of dealing with lightning conductors, adopted by ignorant practitioners is, Dr. Tyndall remarks, to carry the wire rope which forms part of the conductor down the wall and into the earth below, without any terminal plate. Such a "protection" is a mockery, a delusion, and a snare. Some years ago, a rope light-house on the Irish coast was struck by lightning, when it was found by the engineer's report that the lightning conductor had been carried down the light-house tower, its lower extremity being carefully embedded in a stone perforated to receive it. Its object had been to invite the lightning to strike the tower, a bad arrangement could hardly, he believes, have been adopted. He vetoed the proposal to employ a chain as a prolongation of the conductor, as the contact of link with link is never perfect.

THE NEW Y. M. C. A. BUILDING AT DETROIT.

ON this page is presented an illustration from an excellent drawing by Mr. Geo. G. Booth showing the main entrance to the Young Men's Christian Association of Detroit. The building, which is considered the finest in the city, is constructed of red brick and red sandstone, the exterior being rich with bold and delicate carving, and the interior abounding in ornamentation of polished hardwood, principally oak.

The main entrance is on Grand River Avenue. Broad doors of paneled oak and stained glass lead to a wide stairway with walls of richly paneled bog oak of a sage green color. This opens into the main reception hall, a capacious and luxurious room, with ceiling of terra cotta plaster work and bog oak beams. On one side is a fireplace of artistic design, reaching from floor to ceiling. Richly-carved pillars of Lake Superior red stone form its sides, and above are elaborate carvings in oak, with a design of the society's national emblem.

The hall in the rear is built in opera house style. The wood-work and frescoing displayed here are extremely rich and tasteful in design.

The furnishing and decoration of the main parlor, leading off the main entrance, is marked by an aesthetic elegance which is rarely seen surpassed.

The building also contains a private office for the secretary, lecture room, directors' room, general reading room and boys branch reading room, dining room, gymnasium and bath rooms.

There are chandeliers for both gas and electricity. They are of rich antique pattern, and designed to match the furnishings of each room.

The sanitary appliances are of a high order. In the assembly hall, the ventilation is so perfect that the air is changed every eight minutes.

The total cost of this handsome structure, is $118,000.

The architects of the building are Messrs. Mason & Rice, of Detroit.

ENTRANCE TO NEW Y. M. C. A. BUILDING, DETROIT, MICH.

ARCHITECTURE IN CANADA.

BY JAMES BALFOUR.

LOOKING at the principal cities and towns in Canada from an architectural standpoint, they must be considered a failure. This is especially true as regards the character of our homes, and I trust you will make an effort in your new journal to impress upon the public that if our homes are to be beautiful, the errors that have crept into society and for which the architects are to a great extent responsible, must be corrected. One error is that clients dictate too much in regard to style, and insist on being "in the fashion" notwithstanding the advice of the architect. On the other hand, it is to be feared that few architects have the courage to stand up for their opinions, or else they are unable to impart the knowledge which their clients require and are in search of. When the client finds that the architect is wanting either in courage or knowledge, he frequently takes the management into his own hands so far as the art portion is concerned, and at once instructs the architect regarding his "taste," or want of taste, as it evidently is ninety-nine times out of a hundred. To be sure the architect will occasionally come across people of good judgment who require his services, who are content to leave the designing of the building in his hands. In such cases the architect is to blame if he does not at least make a truthful building. How often do we find, however, that the architect is ready to belittle his profession by attempting to make a monument to himself out of what should be a merchant's home. For instance, it will be decked off with galvanized iron cornices, etc., painted and sanded to look like stone; it will have good honest pine grained to imitate rosewood or oak, and in all likelihood will have a tower and balcony, and no way to get to either; and they would be of no use if they could be got to. His client's comfort, which ought to be the highest consideration, is in this way almost lost sight of entirely.

If architects wish the public to have that respect for their profession which it should have, they must be educated in science and art, and be able and not afraid to impart it to their clients. They must discard fraud in building, put away all imitations, and build truthfully showing the import and meaning of every feature. Neither must they be afraid to introduce new ideas after giving them careful thought, for this is where the true artist excels. He must give more study to the requirements of the age in regard to comfort, sociability and entertainment. The more truthful we make our homes, the better they will meet the above requirements, and the coming generation will be better able to attain the summit of perfection which we should strive for—that is to say, a style of architecture suitable for our homes in this country.

It strikes me the few real architectural students that we have, pay too much attention to the study of the history of architecture, in place of developing architecture, and attempt to make ancient styles conform to modern requirements; others again try to squeeze the styles into such a form as will suit the so-called "tastes" of their clients or accord with the "fashion." This is all wrong. To gain the respect and esteem of the public a radical change must be made for the better. Let us leave all untruthful and flimsy building in the hands of the speculative builders; when in a short time it will be appreciated according to its true value, and the profession will gain the admiration as well as the patronage of all honest people. I believe if the architects in this country would begin to design (not copy) buildings, keeping in view the purpose for which they are building, drawing no line that does not express a purpose, that a new and perfectly suitable style would soon beautify our cities and towns. To do this it is not necessary to disregard the styles of the Greeks or Romans or the architecture of the middle ages, but to develop them in such a way that they will give expression to thought. Why people of to-day should follow the Greeks or the Romans more than the Greeks or the Romans followed the Egyptians, I cannot understand, and I think if we make an effort we will succeed in producing a Canadian nineteenth century style. As I said before, I do not think it necessary to start afresh—to make a new style—any more than did the Greeks, the Romans, or the architects of the middle ages. Had they worked in strict accordance with the styles of their predecessors, we would still be building pyramids. We have more scientific knowledge than they had. Why then should we be discouraged from trying to make architecture again a living art as it was in and previous to the thirteenth century?

This is a question which calls for an answer from the architectural profession in Canada, and I think the time has come when it should be intelligently dealt with.

THE ARCHITECT.

BY JAMES YOUNG.

AS an architect of many years practical experience, I desire to submit a few observations under the above heading, which I trust may be thought appropriate for the first issue of a magazine that is intended essentially for the benefit of the building profession.

It is said that there is much in a name. What does the name "Architect" imply? It means in the accepted term, "a master builder;" that is, one who by long study, aided by a general proficiency of education, has acquired a proper knowledge of the elements of architecture, and the ability to practically lay out his designs and plans, both general and in detail, with specifications, so that the same may become the basis for a contract, and that the building erected from them under his practical direction and superintendence, be carried out to a final completion in the best possible manner.

Now it must be apparent, even to the most casual observer, that to reach such attainments and become a duly qualified architect, is an arduous undertaking requiring ability, patience and perseverance, often under more or less very trying circumstances. The same may be said of the other learned professions—say surgery, law, or even land surveying. The student in each case goes through the necessary course of study, finally passes his examination, and is admitted to practice under a degree conferred on him by the faculty. This ordeal is deemed necessary to protect the public from imposition and the professor in his practice—he is a "professional man."

In what manner does the architect now become a professionalist? Are his attainments of such a lofty order that he is at once proclaimed by public intuition, and requires no safeguard against the inroads of pretenders and the assumption that surround him? How frequently do we see a newly-risen sign setting forth a new aspirant for the name and practice of an architect—self-made, self-ordained—who, having acquired the rudiments of drawing (however creditable that may be), and a slight knowledge of building construction, but without the ceremony of further initiation, constitutes himself an architect fully fledged, ready for work? And yet there is no law to prevent his doing this. He has the right to place his name on the roll of the profession without let or hindrance.

The question arises: if he considers himself qualified, is he privileged to do this? What responsibility does he assume, and can he be prevented from doing so? The answer is, "yes, he has the privilege, there being no restriction"—his patrons' probable claim for assumpsit may be satisfied, if he is in a position to give such satisfaction, and he will be at liberty to style himself an

architect and practice the profession just as long as the architects are so regardless of their own interests as to allow him to do so.

Can an individual, however skillful he may think himself to be, put up his sign and practice as a surgeon, barrister-at-law, or even as a land surveyor? Certainly not; although these professions are surrounded by a large area of amateur practice and quackery. Then surely the profession of an architect is as deserving of legal right and protection as that of the surgeon, lawyer or land surveyor. But the architects of to-day have no such protection—the name is merely a suggestive one. No doubt we have noble institutions in some cities, for instance the "Royal Institute of British Architects," the "Institute of American Architects," and others, and members thereof have no doubt proved their qualifications—because they thought fit to do so—not that they were required to do so, or that it was necessary as a qualification to practice.

And now to remedy all this, and to place the architect on the same footing as members of the other professions, let architects get themselves incorporated as a body, in the same manner and way that the land surveyors have done. This is a duty they owe to themselves and also to their students, who pay them large fees and devote years of time in learning the profession; for why should these students, at the expiration of their term of servitude, not be required to pass the examination and secure the degree that would distinguish their profession and protect their practice of it from the inroads of any who for want of ability, means or opportunity, have not graduated and obtained the license to practice?

The profession of architect has a right to be so protected. Its aspirations are noble. Its object is to benefit and improve society and mankind in general; and certainly no more selfish object can be imputed to it in desiring incorporation than to that of the provincial land surveyor. Why not architects have, then, a regulated scale or tariff of legalized fees which they can demand for service done? At present their commission or fee may be established by usage, but is not by law. In a recent case in one of the Canadian law courts, an architect who had attended for three days to give expert evidence in a building suit, was informed by the judge that he could only claim for his time the same rate as laborers' wages. At the same time a young P. L. S., who was also a witness, received $4.00 per day for his time, the learned judge remarking that he often felt surprised at the apathy of architects in not getting themselves incorporated, which would entitle them to professional pay.

No doubt the suggestions herein made have long since engaged abler minds than mine, but why has action not been taken in the premises? Will the rising generation of young architects not rise in their might and right, and have established for themselves an Act that will forever raise the standard and dignity of their profession and secure them against imposition and empiricism?

In conclusion, I hope to see in future issues of the CANADIAN ARCHITECT AND BUILDER, comments on this subject from architects, and especially from the junior members of the profession.

POSITION, STANDING AND DUTIES OF AN ARCHITECT.

By "CONSTANS FIDES."

THE position, standing and duties of an architect are so misunderstood by the general public, that perhaps it would be well through your new journal that the employer and the public should be better informed thereon.

An architect is supposed to have had a good education, and to be capable of designing any class of private or public building. He should be a good mathematical scholar, a good draughtsman, a free-hand draughtsman, an artist, capable of putting all his designs in perspective, as also all details for the purpose of illustrating details that are difficult for the workman and contractors to understand. He should know harmony of colors, and be capable of showing the public at a glance what his building is intended for when executed. He should be a sober, honest and truthful man, free from bias, showing no favour, polite and genial to all—in fact his standing, if he knows his profession, should be justly conceded to him by his employer and the contractor and the many artisans that he must of necessity be thrown into contact with; whose suggestions he should be ready to hear, and, if found practical, to adopt; provided they do not interfere with execution and design. We can all learn a little from the most humble, however poor and uneducated he may appear. The writer has derived much valuable information from such a one, and would therefore advise architects to listen quietly to the sober practical talk of a good artisan.

An architect should act as an impartial judge between the employer and contractor. He should never allow the contractor, his foreman or men, to have any suggestions made to the employer unless he be present. I would not say that the contractors or men would do or say anything tending to dishonesty, but it is better that all such conversations should be heard by both parties. It will save many disputes, and perhaps a law suit, which it is better for both parties to avoid.

An architect's duties are to make and submit small scale drawings or perspectives to his employer, and afterward, large scaled drawings and details of what is decided upon. In my younger days details were always submitted to the contractor. This procedure is far more honest to both the employer and the contractor, not perhaps necessary for the employer, but most decidedly of advantage to the contractor who is thereby better able to give an honest and fair tender. If large free-hand perspectives be given the more laborious geometrical details may be dispensed with until the contract is let.

The specifications should be precise and full, describing everything so far as possible in the vernacular of the different trades. There is no necessity for describing why such and such materials are called for. I have seen whole pages written that were quite ridiculous, and of no earthly use but to make the party tendering smile. The architect must, in conjunction with the contractor, lay the building out, having proper lines strained beyond the outer intended walls if possible, and permanent stakes driven, which should never be removed until the building is up to the ground floor. All angles should be properly and truly squared off, and proper bench marks left or fixed upon. In large buildings this will be found absolutely necessary. In my own practice I adopt it in the most simple building. I am aware it cannot always be done. If you have a clerk of works you will have to depend upon him, and if he should be employed by the proprietor, you had better have nothing to do with the work at all—far better to give up the entire work to the proprietor and his factotum, for you will never have a moment's rest.

The architect's duty is to measure and appraise the work as it proceeds—always in the presence of the contractor—to give certificates, and, finally, to make out all accounts in a business-like manner for the different trades. It is absolutely necessary that all accounts should be detailed in full—every item priced and carried out to a separate column—and not, as I have seen it done, without detailed prices. No honest purpose can be served by attempting to hide details The proprietor is entitled to know what he is paying for. I have found it best to have a schedule of prices for the separate trades made out as soon as the contract is signed, based on the tender, witnessed, signed and filed away. No honest contractor can object to this. If the architect is honest the contractor need not fear that his competitors will obtain his prices.

Architects' charges are moderate, considering that they require to spend half a life-time in study in order to obtain a knowledge theoretical and practical of their profession and of the different trades connected therewith. The tariff of charges laid down by the Royal Institute of British Architects, the Royal Hibernian Society of Architects, Dublin; the American Institute of Architects, U. S.; the Paris Architects, the Berlin Architects, the Vienna Architects and the Russian Architects, are all commendable and equitable. The law courts of all these countries are guided by their tariffs, and were all architects to study and be guided by the same, there would be less objection to the charges made by the professional employer. I recollect a remark made in court at the conclusion of a trial by Chief Justice Cockburn that he was astonished at the knowledge of the most practical kind shewn by the architects who had given their evidence before him. He had been perfectly in the dark regarding knowledge which they had shewn themselves to be individually possessed of, and wondered how they had acquired it. He then suggested to his learned legal brethren that they should take a leaf out of the architects' book

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The Toronto Public Library has expended $350 in the purchase of the architectural work, "La Basilisque de Sanit Marc a Venice.

Architect Timewell, of Winnipeg, has commenced work upon the buildings for Dr. Barnardo's training home for boys at Russell, Man.

Mr. S. Defries, of this city, who has recently visited Salt Lake City, describes the Mormon temple as a magnificent piece of architecture.

The auditorium at Grimsby Park, Ont., is to be covered by a dome 112 feet in diameter at its base and 24 feet at the top. From the circle at the top will rise a row of pillars 20 feet high, capped with ornamental work and enclosed with amber glass. The dome will be cone-shaped and will be entirely supported by nineteen oak pillars 21 feet high, buried a depth of six feet in the ground, and surrounded by masonry up to the ground's surface. The dome is designed to shelter 8,000 persons.

A new system of building houses of steel plates is being introduced by M. Danly, manager of the Societe des Forges de Chateleneau. It has been found that corrugated sheets, only a millimeter (0394") in thickness, are sufficiently strong fur building houses several stories high, and the material used allows of architectural ornamentation. The plates used are of the finest quality, and as they are galvanized after they have been cut to the sizes and shapes required, no portion is left exposed to the action of the atmosphere. Houses so constructed are very sanitary, and the necessary ventilating and heating arrangements can readily be carried out.

The Architectural Draughtsmen's Association of Toronto, which forms the Architectural Section of the Canadian Institute, has been devoting its energies for the past few months principally to sketching from architectural models, competition designing and readings. During the remainder of the winter a number of instructive papers are to be read by members. The different branches of the building trade will be taken up and practical talks given by some of the most able builders of the city. It is hoped that those draughtsmen and students who are not already members, will become so, and make this Association the great success which its objects merit. Reports of meetings will be given in future numbers of this paper.

DESIGNS FOR CHEAP COTTAGES.

WE show this month four designs, with accompanying floor plans, of cheap cottages.

These designs will be found to meet the wants of that large class of persons who desire a house of their own, yet whose income will admit of no more than a modest outlay. That there is a large and increasing demand for such houses is plainly evidenced by the correspondence received at our office.

The houses are exceedingly picturesque, and if carried out according to the drawings, which any builder can execute, will be found to make exceedingly attractive homes. The floors are well arranged, as will be seen by reference to the plans, all the rooms being of good size and convenient of access to each other.

The prices given are inclusive of everything. Without foundation, each house can be built for about $200 less. The estimates are based on the figures of a reliable builder. In some localities, where the conditions are more favorable than here, they can, of course, be built for less, while in other places the cost may exceed the figures given.

PERSONAL.

Architect Gordon, of the firm of Gordon & Helliwell, Toronto, is at present in Europe.

Architect Symons, of this city, has recently recovered from a severe attack of diphtheria.

Messrs. Gerrie & Sterling, contractors, of Rat Portage, Ont., have dissolved partnership.

Mr. John Atkinson, a well-known builder, who resided in this city for more than forty years, died on the 8th. inst.

We regret to record the failure of Mr. W. H. Boulter, builder, of this city. His liabilities are estimated at about $25,000.

Mr. Edward Martin, builder, of this city, was recently presented with a handsome gold watch by his employees as a mark of their esteem.

The sad intelligence comes from Ottawa that Mr. John Baptiste Gouvreau, Inspector of Government Buildings, dropped dead on the street in that city, on the 4th. inst. His death is attributed to heart disease.

A pleasant evening was spent by the members of the Amalgamated Society of Carpenters and Joiners, at their annual dinner at the Albion hotel, in this city, last month, President James Rose presided over the festivities.

D. L. Symons, of the firm of Strickland & Symons, Toronto, has been appointed teacher of architectural designs and construction in the Toronto School of Art.

Mrs. Geo. Watson, of Norfolk County, is the first female contractor we have heard of in Canada. She is said to have built the Universalist Church at Nixon, Ont.

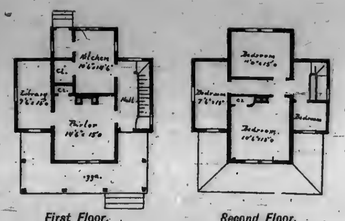
Mr. E. M. Ross, foreman for the J. T. Pease Furnace Co., this city, was recently presented with a complimentary address and a gold headed cane by his fellow-employees.

Mr. Andrew Onderdonk, well-known as the contractor of some of the largest public works in Canada, is building the six mile tunnel through which the city of Chicago will be supplied with water. The undertaking will take four years to complete.

Thomas V. Walter, widely known as the architect of the Capitol at Washington, died at Philadelphia recently. Dr. Walter was one of the most gifted architects produced by the United States, and has left many monuments of his genius, the most magnificent being the capitol.

COTTAGE COSTING $1,200.

COTTAGE COSTING $800.



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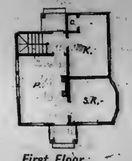

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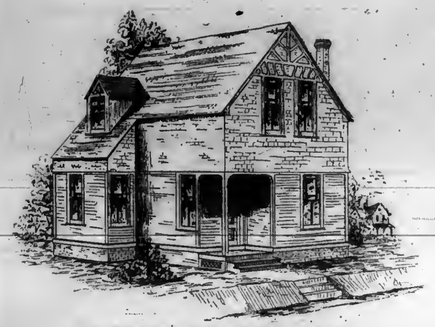
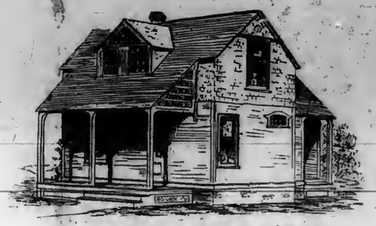
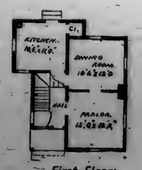
DESIGNS FOR CHEAP COTTAGES.



COTTAGE COSTING $950.



COTTAGE COSTING $950.



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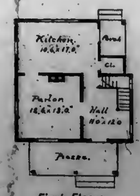

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MONTREAL.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

The past year has been of considerable importance in the building annals of the City of Montreal.

There were about eleven hundred (1100) new buildings erected during the year 1887 at an estimated cost of four million (4,000,000) dollars as against six hundred and ninety nine (699) in the previous year. And the highest record during the past twenty three years was in 1871 when there were one thousand and sixty buildings erected.

There is nothing of the "boom" about this large increase but it is the natural result of a demand for increased accommodation.

The current year will certainly show a still further increase, especially in the amounts expended, as there are a number of very important buildings under way.

The first in importance are the two new depots, the C. P. R. and the Grand Trunk, at an estimated cost of three hundred and fifty thousand dollars.

The other important buildings under construction are the New York Life Insurance Company's office on the Place D'Armes, the new Methodist Church on St. Catherine street, and the Technical Schools, the latter being the property of the order of Christian Brothers.

As soon as the C. P. R. depot and offices are completed the present building on St. James street will be taken over by the Imperial Life Insurance Company and three storeys will be added, thus adding another to the many imposing structures on St. James street.

The Mechanics' Institute will be entirely re-modelled at a cost of thirty thousand dollars. A storey will be added and a handsome clock tower will complete what will certainly be a fine building worthy of the institution.

The competing plans for the new Protestant Insane Asylum to be erected between Montreal and Lachine are hung in the Mechanics' Institute. There are five exhibits, and they will be adjudged in the course of this month.

The Building Inspector states that the cost of building materials such as brick, lime, stone and timber, was last year 25 per cent higher than in 1886. Wages also were higher. Carpenters were paid $1.50 to $2, painters $1.75, plumbers $2, bricklayers $3.50 to $4.50, being an increase of about $1 a day; stonemasons $3 to $3.25, being an increase of about 50c.

WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

Things in Winnipeg and Manitoba generally, are always quiet at this time of the year, and particularly so just now in consequence of the undecided position of railroad and political matters.

The difficulty here is that any one having an idea of erecting new buildings will wait until later on in the year to see what is going to turn up to warrant the outlay, and generally before any decision is arrived at, the season is so far advanced that a great deal of valuable time is wasted getting ready; our actual building season being so very short.

However, the prospects for building are very good this year. All lines of business have been benefitted by the splendid crops we have had, and a great number of people have thus been enabled to square up old matters and have cleared the atmosphere as it were, so that new liabilities can be entered into.

Endeavors are being made by both men and contractors to establish combinations in order to keep up prices for labor and contracts generally, but on account of the transient or migratory nature of both artisans and contractors, this will be a difficult matter for some time yet. Men who will take work at any price are continually coming in; and as most people building insist upon the lowest tender being accepted, there is often trouble in getting work finished, and a season often passes before a respectable contractor can get work.

At a meeting of builders, contractors and sub-contractors held in Winnipeg last month, "The Builders' Association" was formed. The Association, which is designed to include all interested in the different branches of construction work, elected the following officers: J. G. Latimer, president; E. Cass, vice-president; J. A. Girvin, 2nd vice-president; J. L. Wells, treasurer; H. J. Raymer, secretary. A committee was appointed, composed of Messrs. J. H. Harris, James Thompson, Murray (of Murray & McDiarmid), and the president and secretary to draft a set of by-laws.

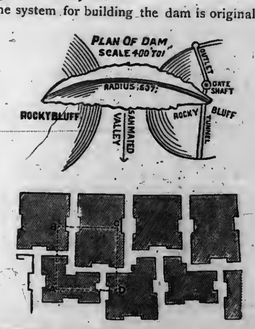
"The Amalgamated Council of the Building Trades of Winnipeg" is the name of another new organization composed of delegates from the various unions in connection with the building trades. The officers elect are: President, B. Nicolson: vice-president, C. Harrison; recording-secretary, W. H. Reeve; financial-secretary and treasurer, T. V. Rutherford. The following rate of wages was approved of: bricklayers, 45c. per hour; carpenters, 30c. and 45c. over-time; plasterers, 40c. and laborers 20c. over-time 30c.

As a natural consequence in a comparatively new country, partly owing to the migratory habits of some contractors, the tenders for works publicly advertised for during the last two years in Winnipeg have been very wide; and in many cases bids have been below actual cost, causing great dissatisfaction among established builders, and loss to those to whom the works have been awarded. In order to endeavor to establish a more healthy basis, the builders and contractors are forming an association by which they hope to obtain a fair price for their work, and shut out irresponsible men. The price of labor in Winnipeg to day is:—Carpenters, $2.50; painters, $2.50; labourers, $1.75; bricklayers, $4.00; masons, $4.00; plasterers, $4.00. Prices of materials:—dimension stuff, spruce $16.00; dimension stuff, pine $18.00; drop siding, $22.00 to $34.00; flooring, $22.00 to $35.00; clear pine, $35.00 to $50.00; shingles, $2.00 to 3.50; bricks @ $10.50, cement @ $5.00, plaster @ $2.75, lime @ 20c. to 25c., nails @ $3.75 to $4.50.

THE GREAT DAM AT SAN MATEO.

Our readers have heard of the great dam which is being constructed at San Mateo, Cal., to furnish a water supply for San Francisco. As an engineering work it is exciting notice everywhere.

As the system for building the dam is original, a detailed description, may not be found uninteresting. Herman Schussler, the chief engineer of the company, has had charge of the work from the outset. After the excavations which laid bare the bedrock, the most important thing was he manufacture of the concrete. Every thing in this branch of the work was original. An enormous structure, consisting of three platforms, was built on the side hill near the site of the dam. On the upper platform are placed the huge bins for sand, that is hauled in wagons from Northbeach in San Francisco. Near by is the rock crusher which grinds the coarse rocks into pieces no larger than walnuts. The crushed rock then passes into a larger roller, and is thoroughly washed by a two inch jet of water. Cleaned of all dirt it falls into a chute, and is emptied into boxes that hold exactly twenty-two cubic feet. These boxes are on wheels, and when one is ready to be emptied there are brought at the same time on tram cars one barrel of Portland cement and two barrels of sand. In this proportion they are emptied into a chute, which leads to the mixer on the third platform. On this platform are ranged the three engines that furnish the motive power for all the work. They are detached, so that any accident to one does not retard the work of the others. The mixer is made of 5-16 boiler-iron, in shape like a cube set askew. This revolves and thoroughly mixes the material, and the concrete falls into carts that are run on a big platform out over the dam. Each carload is dumped into large pipes and falls to the level of the dam, where workmen wheel it to the place required. The capacity of the concrete machines is 450 barrels per day, each of twenty-two cubic feet, or 10,000 cubic feet of concrete. No description can give any idea of the ingenuity with which time and labor have been saved here. Everything runs like clock work, and the plan of using barrels instead of box-cars saves an immense amount of rehandling of material.



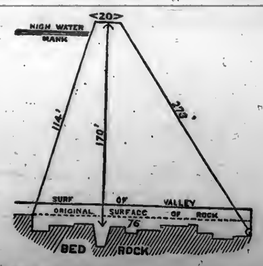
PLAN SHOWING POSITION OF CONCRETE BLOCKS—SCALE 40' TO 1".

Dotted line A. B. C. D., showing approximate position of Block in next layer.

Down at the dam the same originality and ingenuity are shown. The blocks of concrete are laid on the following plan: After the bedrock is carefully cleaned and all moisture gathered up by sponges, the work of laying a concrete block is begun. First is made a framework of wood of varying sizes, twenty feet or less square and six feet thick. Into this the concrete is dumped from wheel-barrows. Men with shovels spread it even, and stamp it down with heavy iron rammers. When this framework is filled it is covered even with boards, kept wet to prevent rapid evaporation, and allowed to dry from seven to ten days. At the end of that time the concrete in the bulkhead is as hard as rock, and tests have shown that in moving it does not scale off from the foundation, but it brings away the solid bedrock, of which it has actually become an inseparable part.

The sections of concrete are all laid with reference to a common center, indicated by a flag. In all other dams of this kind the concrete is laid as a monolith in large blocks covering the entire area. Mr. Schussler's plan has been to break joints with every block of concrete. The dimensions of the dam are: Height, 170 feet, width at base, 176 feet; width at top, 20 feet; slope on water-side, 1 foot horizontal to 4 feet vertical; slope on the lower side, 2 feet horizontal to 3 feet vertical. The area of the reservoir is 1,800 acres; storage capacity, 32,000,000,000 gallons; elevation above tide, 300 feet.

The arrangements for drawing water from the reservoir are peculiar. A shaft 14 feet clear of brickwork is sunk from the rocky bluff on the water side of the dam which is tapped by four tunnels from the reservoir side. At the point where each of the four tunnels joins the reservoir it will be provided with a movable iron screen. At the point where each of the four joins the shaft it will be mounted with a 44 inch water gate. Each tunnel is 35 feet above the other. All these four gates connect in the shaft with a vertical cast-iron pipe, 50 inches in diameter, which again at the base of the shaft has an elbow that leads into the main outlet of the tunnel. This is 7 feet 6 inches clear of brickwork, through which the 50 inch pipe is to run and connect with the 44 inch pipe that leads to San Francisco. At the outlet of this latter tunnel, which has a length of 306 feet from the shaft, the main regulating gate will be placed in the 50 inch pipe. The four gates mentioned in connection with the main shaft are intended to allow water to be drawn from different levels of the reservoir. An iron winding staircase will be constructed in the shaft to admit of easy access to the three gates. The top of the main shaft will extend 10 feet above high water mark.



CROSS SECTION OF DAM—SCALE 80' to 1".

The direct water shed of this reservoir is 24 square miles, but it is so situated that it can receive the waste waters from the adjoining San Andreas Reservoir, as well as from Pilarcitos, both of which are in the neighborhood and at higher elevations than this. The company proposes to make this Lower Crystal Springs Reservoir the receptacle not only of direct and immediately adjacent water sheds, but also of the water shed of San Francisquita Creek, which has an area of twenty-five square miles, the Pescadero and San Gregorio water sheds, which have a combined area of fifty-five square miles, and eventually that of the Calaveras water shed, which lies on the east side of San Francisco Bay, and which has an area of 140 square miles. In order to connect the San Francisquita water shed with this Crystal Springs water shed a tunnel five miles long and eleven feet clear in diameter is to be constructed, while it will take an additional five miles of tunnel to bring in the Pescadero and San Gregorio water shed, and a two mile tunnel and twenty two miles of pipe to connect the Calaveras water shed.

THE BUILDING RECORD FOR 1887.

AYLMER, ONT.—This town expended $87,200 in new buildings last year.

PERTH, ONT.—59 new buildings were erected here last year at a cost of $81,525.

TILSONBURG, ONT.—Tilsonburg expended about $75,000 in new buildings last year, and the indications are that that amount will be exceeded next season.

WOODSTOCK, ONT.—About $350,000 was spent in new buildings last year, notable amongst which are the new hall of Woodstock College, the new furniture factory of James Hay & Co., and a couple of organ factories.

BELLEVILLE, ONT.—About $150,000 was expended in new buildings last year and $100,000 on water works construction.

SMITH'S FALLS, ONT.—The citizens of the town and the Canada Pacific Railway Company expended in new buildings last year $187,000.

BRANTFORD, ONT.—This city spent $500,000 in new buildings in the year 1887.

PETERBOROUGH, ONT.—The value of the new buildings erected in Peterborough last year is estimated at $200,000.

WATERLOO, ONT.—The building operations in this town last year involved the expenditure of $101,500.

MONCTON, N. B.—The total amount spent in building during 1887 was $70,000, including $9,000 on church extension and improvements, $12,000 on new railway shops and $7,000 on the basement of the new Roman Catholic church, to cost, when completed, $40,000.

HALIFAX, N. S.—The growth of this city is indicated by the fact that new buildings valued at $750,000 were erected during the year just closed. Among the most prominent of these are new city-hall, Dalhousie university, a ladies' college, a sailors' home, two or three churches, and quite a number of stores and dwelling houses.

STRATFORD, ONT.—$450,000 were spent in erecting new buildings last year, of this sum $200,000 was expended by the G. T. R. Co., on their new shops. The new comb house and jail cost $96,000, and new high school and brewery $10,000 each.

Following are the permits for buildings costing $1,000 and over issued by the Building Inspector, Toronto, during the year 1887:

W. T. Sym, ad. and alterations at 131 Church St, $3,000; J. D. Nasmith, bk. alterations and ad. to store, s. w. cor. Jarvis and Adelaide, $2,900; J. Wanless, 2 storey bk. ad. alterations to store, s. w. cor Yonge and Queen Sts., $18,000; Donato Glionna, 2 storey r. c. bk. front dwell. 262 Elizabeth St., $700; Geo. Welsh, two 2 story r. c. bk. fronted dwells. n. Mutual St., $1500. W. C. Gilbert, two 2 story r. c. bk. front dwell, Mutual St., $1500; R. Hibbit, three attached r. c. bk. front 2 story dwells, Parliament St., $4200; Mr. Fallairze, two s. d. 2 story r. c. bk. front dwells. w. s. Parliament St., $3000; A. Little, 3 attached 3 story bk. stores, Spadina Ave.; G. Kerr, alteration and ad. to 259 and 261 Simcoe St., $1000; Thos. Burns, erection and alteration n. w. cor. King and Parl. Sts., $1800; R. Thompson, two s. d. bk. dwells; Mr. Calhoun, three attached 2 story bk. stores, n. e. cor. Spad. Ave. and Carr Lane, $8000; R. H. Lear, bk. ad. to 15 and 17 Richmond W., $4000; W. I. Williams, three pairs s. d. 2 story bk. dwells. on Dovercourt Rd, $14,400; Messrs. Rolston, two s. d. 2 story and attic bk dwells., College St., $5500; R. H. Gray, one story bk. ad. to 8 Queen W., $3500; Alex. Barnes, alteration to 9 and 11 Buchanan St., $1200; Thos. Douglas, seven attached 2 story r. c. dwells., cor. Orde and Murray $8400; Ald. Baxter, three r. c. 2 story dwells., n. e. cor. Vanauley and St. Andrew St., $4000; Langley & Langley, 1 story bk. Mission Church, cor. Edward and Price lane, $2000; W. J. Harris jr., 3 story r. c. factory in rear of 17 and 19 William St., $1500; J. E. Thompson, 1 story bk. ad. rear of Winton Chambers, $1800; H. Nelson, 1½ story bk. stable e. s. St. George St., $1400; I. Hewitt, 2 story r. c. dwell., 154 Seaton St., $1000; Dr. Wagner, alterations 7 Gerrard E. $1300; F. Clements, seven attached 2 story and attic r. c. dwells., e. s. Major St., $8400; J. J. Lucas, r. c. ad. to coor. Terauley and Louisa, $2700; Mr. McBurney, one pair s. d. 2 story r. c. dwells., rear 66 and 68 Beverly St., $2000; Catharine C. Howard, alterations and ad. cor. Wellington and Peter Sts., $9000; Cook's Church, alterations and ad. $11,000; J. W. Brown, 2 s. store and dwell., Bathurst St., $2500; Mr. Parker, pair s. d. 1 story and mansard bk. dwells., Boswell Ave., $6000; Geo. Gray, pr. 2 bk. dwells., Richmond St. W., $4000; H. Garde, pr. s. d. 2 s. bk. fronted dwells., Huntley St., $1800; W. B. Capron, 2 storey r. c. dwell., Bleeker Pl., $900; W. H. Stonehouse, pr. s. d. bk. dwells. Dovercourt Rd., $3000; J. Hofland, 1 story bk. ad. 264 and 266 Church St., $900; R. Spencer, ad. and alterations cor. Markham and Colby Sts., $1500; G. Proctor 4 story, bk. factory, Pearl St., $8000; Thos Painter, 2 story and attic bk. dwell., Huron St., $2300; Jas. Good, 2 story and attic bk. dwell., Rosedale, Ave., $4700; Girls' Institute, cor. Shepherd and Richmond Sts., $4000; Geo. W. Miller, 2 story and attic r. c. bk. cased dwell., Elizabeth St., $2506; J. Murray, 2 story and attic bk. dwell., Lowther Ave., $3000; R. Millichamp, 2 story and attic bk. dwell., Queen's Park, $7000; A. C. Belbin, pr. s. d. bk. dwells., Hope St., $2500; F. A. Campbell, 1 story bk. ad. Richmond St. W., $1400; T. Sullivan, 3 story bk. shop, Alice St., $2250; A. Mitchell, five attached 2 story and mansard bk. dwells., Grange Ave., 17,500; Cobban Mfg. Co., ad. to factory, cor. Hayter and Terauley Sts., $1800; C. W. Kendrew, 2 story ad. at 506 and 508 Yonge St., $1000; Messrs. Bradley & Crossman, bk., stone and glass con., s. e. cor. Spadina Ave. and Phoebe St., $1000; John Fraser, three 2 story a. bk. dwells., University St., $5000; Jos. Walker, 3 story bk. and r. c. dwell., n. s. Alice St., $3700; A. Harvard, two story bk. stores, n. s. Queen St., $7700; Thos. Webb, two 3 story bk. stores, also ad. to store cor. Yonge and Agnes Sts., $5000; T. Thompson & Sons, 3 story bk. store, 135 King St. E., $9000; S. R. Clarke, 4 bk. stables in rear of stores, cor. Augusta Avenue and College St., $1000; W. Pringle, r. c. stable, Rose Ave., in rear of Stephenson House on Parliament St.; W. F. Rogers, pr. s. d. 2 story bk. dwells., Sussex Ave., $4000; T. R. Williams, 2 story bk. ad. n. e. cor. Queen and William Sts., $1000; Bishop Strachan School, 2 story bk. ad., $8000; St. Simon's Church, Brick Church, Howard St., $8000; Geo. McConkey, bk. ad. to 11 Temperance St. $1200; W. Adams, semi-detached r. c. houses cor. Sarah and Belmont Sts., 15600; W. Adams, 8 r. c. houses, cor. McMurrich and Belmont Sts., $6400; W. H. Clendinning, boat house Esplanade, $6000; W. H. Stoneham, 6 pr. 2 story bk. front houses, McPherson Ave., $1600 each; W. H. Robinson, 2 storey res., Concord Ave., $1600; T. Hurst & Son, pr. 2 story attached r. c. dwells., Darling Ave., $1400; W. D. McIntosh, 3 attached 2 story dwells., s. s. Water St., $2800; Brown & Love, gal. iron, 2 story work shop, Esplanade St., $1500; Thos. Pedlow, two 2 story r. c. dwell., Ontario St., $1000; Mrs. Robinson, two 3 story attached bk dwells., 6 and 8 Edward St., $2800; R. W. Abel, 2 attached bk. fronted stores, 224 Parliament St., $3000; H. J. Brown, 2 s. d. bk. houses, Gwynne St., $6000; W. S. Thompson, 2 d. bk. houses Gloucester St., $12000; W. L. Thompson, 11 attached 3 story bk. stores, Spadina Ave., $35000; W. S. Thompson, bk. factory, Pearl St. $3500; W. S. Thompson, bk. offices, Adelaide St. E., $12000; Jos. Duggins, 4 a. 2 story r. c. dwells., w. s. Chestnut St., $4000; E. Hewitt, seven 2 story a. bk. dwells., Carlton Ave., $11000; E. Hewitt, pr. 2 story bk. houses, James St., $2000; E. Hewitt, 2 pr. 2 story bk. houses, Sherbourne St., $24000; C. S. Williams, 3 a. 3 story bk. stores, Centre St., $4500; Land Security Co., two 3 story a. bk. warehouses, cor. Bay and Esplanade Sts., $50,000; J. Elliott, 3 story and attic bk. ad. to hotel s. e. cor. Church and Shuter, $15,000; Consumers Gas Co., 2 story bk. retort house s. e. cor. Berkley and Front, $60,000, also 2 story purifying house s. w. Berkley and Front, $40,000; J. Dickie, six 2 story attached r. c. dwell., e. s. Berkley St., $7500; W. Gooderham, 3 story bk. Institute, $8000; J. Hocking, three 2 story r. c. dwells., cor. D'Arcy and Huron, $2500; J. B. Bastedo, two 2 story r. c. houses n. w. cor. Huron and St. Patrick, $3800; C. R. Peterkin ad. to factory cor. Bay and Temperance, $3000; G. M. Miller, 3 story warehouse, n. s. Richmond, $8000; C. R. Rundle and B. J. Hill, 2 stone and bk. houses, Sherbourne St., $10,000; D. Richards, 2 pr. s. d. houses, Major St., $18,000; Geo. Pepper, eleven 2 story and attic bk. dwells., w. s. Spadina Ave., $50,000; Geo. Pepper, ten 2 story and attic bk. dwells., w. s. St George, $60,000; Geo. Pepper, one 2 story bk. coach house, St. George St., $5000; R. Armstrong, 6 d. 2 storey and attic bk. dwell., cor. George and Gerrard Sts., $19,000; W. S. Thompson, 11 d. stores e. side Spadina Ave., $30,000; Mrs. Morrison, bk. dwell., Beverly St., $5000; Tor. Land Inv. Co., 3 a. 4 story bk. stores, e. s. Yonge, $25,000; J. O'Malley, two 3 story a. stores 160 x 162, Queen W., $10,000; G. G. Dermot, 3 bk. front man. roof dwells., rear of 27 and 28 Maitland St., $2800; J. Thompson, 2 a. 3 story bk. stores e. s. Yonge St., $11,000; Mrs. Emily Stowe, 3 story bk. residence, 113 Church St., $9000; H. Hutchinson, bk. res. 2 story, 281 Sherbourne St., $4000; J. Cooper, 2 story store and dwell., 84 Davenport Rd., $4000; R. Jones, 2 story r. c. dwell., 217 University St., $1000. J. Thompson, 3 a. 2 story r. c. dwells., 169 and 171 Seaton St., $4500; E. Henderson bk. ad. to dwell., St. Joseph St., $13,000; G. Thompson, 2 story r. c. dwell., Homewood Ave., $1000; B. Pickering, 2 story bk. dwell., Berryman St., $1000; R. G. Brookes, 2 story and attic bk., n. e. cor. Jarvis and Isabella Sts., $16,000; T. W. Field, pr. s. d. bk. dwells., also 2 story bk. dwell., $6500; G. Wright, pr. s. d. bk., $5000; Mrs. Hope, 2 story r. c. dwell., Duke St., $1100; F. F. Appleton, 5 a. 2 story r. c. dwells., n. s. McPherson Ave., $4000; C. R. S. Dinnick, 5 prs. s. d. and 1 d. 2 story bk. dwells., w. s. Brunswick Ave., $54,000; Mrs. I. Hodgson, bk. cott., n. s. Grange Ave., $2600; T. H. Palm, alteration to dwell., 63 Yorkville Ave., $2000; A. Morrison, alter. to dwell., 176 St. George St., $2000; D. Lamb, 9 a. 3 story bk. stores, cor. Queen and Sherbourne, $28,000; H. Elliott, pr. s. d. bk. dwells., Wellesley st., $9000; A. Jaffray, 3 story bk. store, w. s. Yonge near College, $6000; D. Carlyle, s. d. 2 story bk. dwell., $4500; E. A. Leviau, 2 story bk. dwell., s. s. Linden St., $4000; W. Nesbitt, alter. to dwell., cor. St. Vincent and Gros., $2000; Mr. Hubbard, 3 story bk. store n. w. cor. Soho and Queen, $5000; T. Walker, 1 storey bk. blacksmith shop, George St., $1000; J. Burness, pr. s. d. 2 story r. c. dwell., e. s. Ontario St., $2300; J. Fletcher, two 3 story stores, 526 Yonge $6000; Geo. Davis, pr. s. d. 2 story bk. dwells., e. s. Gros. St., $2000; G. P. Sharpe, 2 story bk. store, 108 York St., $4500; G. W. L. Shaw, 2 story bk. dwell., w. s. Gwynne St., $2800; R. S. Williams, alter. to 143 Yonge St., $5000; J. Robertson, 2 story bk. ad. to cor. John and Mereer, $4000; Mrs. Swalm, pr. s. d. 2 story bk. dwells., Hayden St., $7000; J. W. Bowdon, 4 a. 2 story r. c. dwells., Winchester Ave., $5000; J. W. Bowdon, 2 story bk. ad. to 38 Winchester St., $1000; Mrs. J. Litster, bk. ad. to dwell., cor. Dalhousie and Wilton Ave., $3500; Mr. Davis, 2 bk. front dwell., e. s. Ontario, $2800; G. McKibbon, pr. s. d. 2 story and attic, w. s. McCaul $4500; Mrs. Lawlor, 2 story r. c. dwell., 66 William St., $1350; J. Hewlett, d. 2 story and attic bk. dwell., Sherbourne St., $3500; J. Hewlett, pr. s. d. 2 story and attic n. s. Isabella St., $17,000; W. Bonnell, one story brick warehouse, 82 Bay Street, $1500; Geo. Anderson, warehouse, Esplanade and Sherbourne, $3500; F. J. Phillips, 2 story bk. dwell., e. s. Queen's Park, $9000; R. Thill, r. c. 2 story dwells., Birch Ave., $1600; Mr. Bethune, 2 story bk. stable, College Ave., $2500; Geo. Acheson, 2 story and attic bk. dwell., s. w. cor. College and McCaul, $6000; Col. Twemp, 2 story and attic bk. dwell., n. w. cor. Bloor and St. George, $30,000; E. Parker, 2 s. d. 2 story dwells., $2800; T. M. Chastoo, 3 story bk. store, cor. Huron and Sussex, $3000; E. Davis, r. c. house ven. front, Birch Ave., $1050; C. L. Van Wormer, stables, College Ave., $3000; J. Snider, man. roof s. e. cor. Queen and York, $1100; G. Vokes, one 2 story bk. dwell., Manning Ave., $3200; R. Dinnis & Son, 3 story bk. factory, cor. Anderson and William, $3000; Cap. Hooper, dwell., Rosedale, $5000; J. Carlow, alter. to 256 Yonge St., $1000; Keith & Fitzsimmons, 2 story bk. ad, 109 King W., $1000.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

THE first annual meeting of the above Society was held in Montreal on the 12th inst., being presided over by the President, Mr. F. C. Keefer, C.M.G., of Ottawa. The following gentlemen were elected to offical positions for the ensuing year: President, Mr. Samuel Keefer, Brockville; Vice-Presidents, Col. C. S. Gzowzki, Toronto, Mr. E. P. Hannaford, Montreal, and Mr. H. F. Perley, Ottawa; Treasurer, Mr. H. Wallace, Montreal; Secretary, Mr. H. T. Bovey, Montreal; Members of the Council, Messrs. H. Abbott, Port Moody, B.C.; F. R. F. Brown, Montreal; F. N. Gisborne, Ottawa; J. Hobson, Hamilton; W. T. Jennings, London, J. Kennedy, Montreal; L. Lesage, Montreal; A. Macdougal, Toronto; H. A. F. McLeod, Ottawa; M. Murphy, Halifax, N. S.; P. A. Peterson, Montreal; H. S. Pool, Stellarton, N.S.; H. N. Ruttan, Winnipeg; P. W. St. George, Montreal; C. Schreiber, Ottawa.

A perusal of the Secretary's annual report shows the Society to be in a prosperous condition. The Society was granted incorporation in June, 1887, and already has a membership of 423. The death of three members is recorded during the year, viz., Messrs. H. W. Keefer, T. Guerin and T. W. Harrington.

The volume of transactions for the year 1887 contains the following papers, which were read and discussed at thirteen ordinary meetings of the Society, and it is pleasing to notice that, so far, the discussions have been of the widest character:—On "Frazil Ice," by Mr. G. H. Henshaw; on the "Canadian Pacific Railway Grain Elevators," by Mr. S. Howard; on the "Foundations of the St. Lawrence Bridge," by Mr. G. H. Massy; on the "Superstructure of the St. Lawrence Bridge," by Mr. J. W. Schaub; on the "Warming, Ventilating and Lighting of Railway Cars," by Mr. J. D. Barnett; on the "Construction of a Guard Lock, by Mr. L. N. Rheaume; on "Snow Slides in the Selkirk Mountains," by Mr. G. C. Cunningham; on "Petroleum as Fuel," by Mr. L. M. Clement; on the "Works on the River Missouri, at St. Joseph," by Mr. H. H. Killaly; and on the "Quebec Harbor Improvements," by Mr. St. G. Boswell; "Water Purification," by Professor Leeds; and on the "Necessity of a School of Arts for the Dominion," by Mr. C. Baillarge.

Only one students' meeting has yet been held, but the Council hopes to see considerable development in this department by the establishment of regular students' meetings, thus awakening the interest of the younger members of the profession, on whom must ultimately depend the status and strength of the Society.

An effort will made to have branches of the Society formed at suitable centers throughout the Dominion.

Nearly two miles of asphalt pavement were laid in Brantford last year.

A new iron bridge is being erected over the Desjardins Canal on the Grand Trunk railway.

The new international bridge at Sault Ste. Marie will be opened for traffic in a day or two.

A temporary levee against the floods has been completed in Montreal at a cost of $40,000.

The town of Chatham is considering the best means to adopt for supplying the citizens with pure water.

Messrs. Parson & Duncan, have made extensive alterations and additions to their tannery, at Beaverton, Ont.

The snow sheds in the mountain section of the Canadian Pacific are of an aggregate length of seven miles.

The Government is building a new break water 3,600 feet long at Port Arthur, the cost of which will be $350,000.

Operations on the Milton waterworks have been discontinued until the spring. The reservoir is about completed.

The recommendation has been made that a building society should be organized at Vancouver, British Columbia.

A handsome church has been erected for the Episcopalians of East Hamilton, Ont., by contractor Ferdinand Slater, of Waterdown.

Mr. Beemer, the wealthy railroad contractor is said to have subscribed half a million dollars towards the erection of a bridge between Quebec and Levis.

The new submarine waterworks tunnel under the lake at Chicago will cost $748,000. The tunnel will be eight feet in diameter, and will extend a distance of four miles.

The feasibility of allowing the Niagara Central railway to build another bridge across the Desjardines Canal at Hamilton is occupying the attention of the Privy Council.

President Tyler of the Grand Trunk Railway Company, estimates the cost of the St. Clair tunnel at £486,000. The company expect to save £10,000 a year in transportation of freight and passengers by means of this tunnel.

The high level steel bridge on the St. Catharines and Niagara Central railway which is designed to cross the Grand Trunk at Merritton will be put in position early in February.

The Cochrane Manufacturing Co., have lately erected a new building, 40 x 54 feet, two and a half stories high, at Dundas. The brick-work was in the hands of contractors Palmer & Hickey.

The number of workmen engaged in constructing the dyke which is designed to protect Montreal from damage by floods, has been doubled, with a view to completing the work on time.

Owing to the refusal of workmen to endanger their lives, the building of the great iron tower, 1,000 feet high which was intended to be the leading feature of the next world's fair at Paris, has been abandoned.

The recent disastrous fire at the Insane Asylum at London, Ont., has led to the consideration of the necessity of laying an 8-inch pipe to connect the institution with the city water works system.

The construction of a swing bridge over the canal at Fenelon Falls, Ont., has been commenced. When it it finished and the new railway bridge built, boats will be able to pass from Sturgeon to Cameron lake.

The contract for the east end of the Cape Breton railway has been taken from contractors Sims & Slater, of Ottawa, whose securities have promised the government to get competent men to push the work on more rapidly.

By the recent completion of three new locks, navigation has been opened on the Trent Valley Canal between Lakefield and Port Perry. The locks are 134 feet in length, 56 feet in width and have six feet of water on the mitre sill.

Toronto builders and plasterers are now charged by the city authorities 2½ cents net per barrel of lime for city water. They are also required to deposit 50 per cent. of the amount usually paid for water during the season. This regulation applies to all brick and stone work.

The Dominion Bridge Co., of this city, are constructing a railway bridge over the St. John river from Fredericton to St. Mary's, a distance of 2,000 feet. The superstructure of the bridge will be put on during the winter. The cost will be about $350,000.

With a view to prevent too rapid, and consequently poor work, the *Engineering and Building Record* advocates a law prohibiting the adding of more than a specified number of feet to the walls of a building in process of construction in one day.

Mr. Y. K. Blatch, of the Department of Inland Revenue Ottawa, has been engaged three years on a large colored map showing the canals and water power of Canada, and competing canals of the United States. The map will also show canals proposed as well as defunct, profiles, lockages, and tables of comparative sizes of locks.

A very nice piece of engineering, by Chief Engineer Hobson, has lately been in progress at the crossing of the Grand Trunk over the Desjardines Canal. A new iron bridge is being put up in place of the old one, piece by piece and the work will be completed without delaying any of the trains.

The Chatham Dredging Co. are engaged in perfecting a drainage system, which, by the aid of earth embankments and pumping machinery, will reclaim some 5,500 acres of swamp land in the township of Tilbury, Ont. The cost of the work will be $45,500, and the undertaking is expected to be complete by next June.

The total number of building societies in the United Kingdom is 1,846; they have a membership of 581,681—an average of 315; they have a total annual revenue of twenty and a half millions sterling—an average of more than £10,000: their total liabilities amount to £51,193,450, and their total assets are returned at £52,931,611.

A few miles beyond St. Thomas, on the Canada Southern railroad, is a very deep ravine, across which an arched bridge about sixty feet long, composed entirely of stone, has recently been constructed. It is very high, and said to be the largest arch bridge of the kind in Canada, and is considered a triumph of engineering skill. The bridge is used both by the railroad company and as a wagon road.

On the 9th of Nov. the first truss of the great bridge to cross the Hudson river at Poughkeepsie, was finished and swing clear. It is 525 feet long between the centers of the towers, 82 feet deep and 32 feet wide; and is the largest and heaviest steel truss in the world. It carries a floor system on top for a double track. The piers are of steel 100 feet high standing on masonry piers 30 feet above high water mark. The foundations are sunk 125 feet below high water mark.

The Dominion Subway Company has recently been incorporated with a capital stock of $100,000. Its purpose is to construct and operate underground conduits or other apparatus and appliances for underground electric and other wires and plant and pneumatic tubes. Among its leading members are Messrs. J. E. Hudson and W. H. Forbes, of Boston; Messrs. C. F. Sise, H. McKay, A. Robertson, J. R. Thibaudeau, G. W. Moss and R. Archer, of Montreal.

The Sault Ste. Marie canal has the second largest lock in the world. It is built of solid masonry, 560 feet long, 80 feet wide, with walls 40 feet high, the lift 18 feet, and the depth of the water in the basin 16 feet. This lock belongs to the U. S. Government and cost $3,000,000, and will accommodate, four at a time, the largest vessels ever brought to these waters. A new and still larger lock to cost $5,000,000, is now being constructed. The canal now has a larger daily traffic than the great Suez canal.

The enlarged Welland Canal is regarded as one of the grandest exhibitions of engineering skill in the world. The water level of Lake Erie is over 300 feet higher than that of Lake Ontario, and this canal has been built to allow loaded ships to pass from one lake to the other. For this passage 28 miles of canal and 26 locks are required. The small village of Port Colborne stands at the entrance of the canal. The first lock is built near the entrance, to keep back the swashing sea, after which comes a stretch of 14 miles through a farming country to the second lock, after which the locks are located about as thick as possible until Lake Ontario is reached. The greater part of the descent is in the upper half mile of the route, and it takes about 13 hours to get through the canal with no hindrances.

Plans have been adopted and contracts let for increasing the roadway of suspension bridge from ten to sixteen feet. Although the change will practically necessitate the re-building of the structure, it will be accomplished without interfering with railway traffic over the bridge. The present anchor plates on the New York side are 18 feet below the surface of the ground; the new plates will be 50 feet below the surface, 26 of which will be solid rock. The cables are composed of galvanized steel wires ropes 2¼ inches in diameter, seven of these ropes forming one cable, each rope having a separate fastening to the before mentioned anchor bars. There will be one pair of cables on each side of the bridge seven inches in diameter, or four in all. On the Canadian side the anchorages will be similar, except that the anchor will be set 36 feet below the surface of the earth, owing to the fact that the rock comes to the surface of the earth at that point. The present cables are amply competent to carry the additional load of the widened bridge. They are of first-class charcoal iron, but as the moduli of elasticity of steel and iron are not the same it is impossible to equitably divide the load between the two sets of cables of different materials, necessitating the abandoning of the present cables for steel ones. The present suspenders by which the bridge proper is held to the cables are ⅝ wire rope, for which ¾ wire rope will be substituted. The present truss system of six feet in depth will be changed to iron of twelve feet in depth, and all transverse beams will be of plate and angle iron, the flooring being secured to rolled I beams. The system of overhead stays will be abandoned, owing to the change made in the depth of the truss. It is the intention to abandon the river guys, substituting therefor a lateral wind cable system that will far more effectually perform the service imposed upon the river guys, and thus do away with the damage incident to them by floating ice and falling rocks, which has been an expense of no small amount. The work of stringing the cables has already begun, and the contract calls for the completion of the whole work by 15th April next.

PUBLICATIONS.

Dixie, the handsomest and brightest trade journal published in the Southern States, marked the attainment of the third year of its existence by issuing a special Christmas number, enclosed in cover of artistic design, lithographed in half a dozen colors, printed on the best of paper, and its pages sparkling with literary gems from the pens of some of the foremost writers on this continent. *Dixie's* special number deserves to be called a superb success.

The different fields for trade journals in this country are being rapidly taken up. The unoccupied area has been narrowed during the past month by the publication of the prospectus of *The Canadian Shoe and Leather Journal*, to be published in this city about the first of February by the Journal Publishing Company, under the management of Mr. James Acton. We wish the new venture success.

SANITATION LIGHT AND HEAT.

BOILERS FOR STEAM HEATING.

By Geo. C. Robb.

A BOILER intended to be used for a steam heating apparatus, should be designed to hold a large proportion of water for the amount of heating surface, and the heating surface should be large in proportion to the grate surface—that is, these proportions should be larger than is usual in boilers intended to be used for steam engines.

The reason for this is, that in a heating boiler a slow fire may be used with great economy, and as the boiler will most likely be often left for a length of time without any attention being paid to the fire, there should be a sort of reservoir of heat stored up in the water.

It is also advantageous in such boilers to have a large quantity of brick-work about the furnace, which will absorb heat when the fire is strong and give it off when the fire is low, and thus tend to maintain a more uniform temperature in the boiler.

Cast iron sectional boilers are often used, but they are most frequently recommended on account of some other reasons than their real value as safe and economical boilers to use. They may be convenient to make, and easy to set up in position, and hence from a maker's point of view be good boilers; but the man who pays for the coals, and the woman who grumbles about the want of heat on a cold day, find by experience that there are other ways of determining whether or not a boiler is a good one. The use of a boiler in a steam heating apparatus is merely to absorb the heat produced in the furnace, and by so doing change water into steam, which is conveyed by pipes to the radiators, where it again gives off the heat while changing steam to water.

There are thus four elements in the complete apparatus, viz., the furnace, the boiler, the piping and the radiators. And there should be a complete cycle going on by means of these, which may be described thus: heat absorbed producing steam from water, and heat radiated producing water from steam. Defects or derangements in any one of these four, will affect the working of the whole, and sometimes it is very difficult to determine exactly where the difficulty really is. Hence frequently a boiler is blamed as being a bad heater, when the trouble really is in the furnace or chimney. In other cases, the fact that in a certain boiler steam can be very quickly got up, is held to be sure evidence that it will answer well for heating, while really the getting up steam quickly is merely evidence of the small quantity of water in the boiler.

In a certain large steam heating apparatus several upright tubular boilers were put in by the designer, who reckoned the amount of heating surface in the boilers by calculating the whole length of the tubes as available and useful for steam making. When the job was started, it was found that while the mains were hot, the radiators remained comparatively cool, and the building could not be heated. By adding more boilers the difficulty was removed, and the apparatus worked all right. The mistake of having the boiler too small is much more frequently made than that of having the boiler too large.

It is better to estimate the boiler by its capacity for evaporating water into steam, than by its heating surface; as no proper comparison can be made between a vertical tubular boiler with fire-box, and a horizontal tubular boiler with brick furnace, if the square feet of heating surface in each be the only dimension given. But if the number of pounds of water at a given temperature which each is capable of making into steam of a given pressure be stated, then a fair and useful comparison can be made, and more especially if the amount of fuel used be also known.

It is usual to state for comparison the number of pounds of water of 212° temperature evaporated into steam at the pressure of the atmosphere per pound of coal as the measure of the evaporative power of the boiler. Thirty pounds of water evaporated in an hour is called a horse power. The term applied to boilers is very confusing, as it is often supposed to have the same meaning as the "horse power" of an engine, whereas there is really no necessary connection between the two; except that it is supposed that an engine ought to do a horse power of work for each thirty pounds weight of steam which it gets from the boiler. Some engines will do a horse power of work with twenty pounds weight of steam, and others will need no less than sixty pounds.

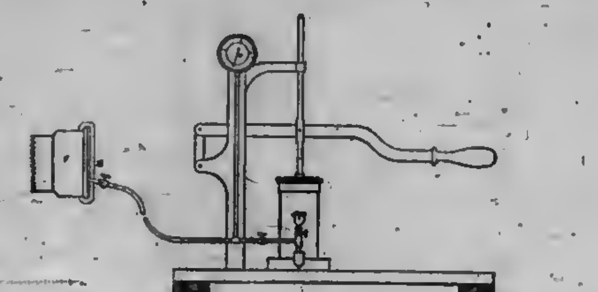
The boiler that is most successful for heating a building, is the one that supplies all the heat needed in the coldest day and gives the least trouble at all times. It will be impossible to do this if the boiler requires a strong fire to be kept up in order to keep up its supply of steam. Hence no matter what form or design of boiler be used, it will not give thorough satisfaction unless it be of sufficient size to keep up steam with a slow burning fire; and a slow burning fire is more efficient in a brick furnace than when the fuel is in contact with the iron of the boiler.

TESTING HOUSE DRAINAGE SYSTEMS.

IN the proposed law governing the erection of buildings in cities in Illinois, recently before the legislature, Section 13 provides that "Every soil and every waste-pipe hereafter constructed and placed as such in any such city or village, shall be of cast-iron, or brass, or porcelain (except subordinate, lateral and connecting pipes not exceeding eight feet in length, which may be of lead,) and when such pipe is put up for use, it and the joints thereof shall be capable of sustaining an internal pressure of not less than fifteen pounds to the square inch of surface."

At the various conferences which were held to consider this bill, this section was abundantly discussed, and particularly the manner in which the test should be applied. It was stated that a column of water in the soil-pipe might, in some cases, give too great a pressure at the foot and not enough at the top, while an air test would give an equal pressure throughout the system, but defects would be difficult to discover. The committee which prepared the bill stated that it would be satisfied with any test which would secure the required result and did not care to specify how the result should be applied.

The inspector of plumbing in the city of Minneapolis, Minn., Mr. Hazen, has designed a pump and gauge for applying the air pressure test to systems of plumbing, and the *Northwestern Architect* gave illustrations of its construction and use which we herewith reproduce, giving in addition some particulars of the apparatus supplied by the *Sanitary News*:



The test pump devised by Inspector Hazen is not patented and any mechanic is at liberty to construct one like it. In making the pump, brass pipe is used, and the joints may be soldered after having been screwed together. The guage is an ordinary steam-gauge, and costs about $2. The other cup, B, is a simple engine oil cup with cap, but the appliance (clasp, etc.,) connecting with the fresh air inlet pipe has to be made to order. The total cost exclusive of pump is but $10 or $12. Several plumbers of Minneapolis have made them for their own use, using an ordinary well-pump cylinder, which they find works very well.

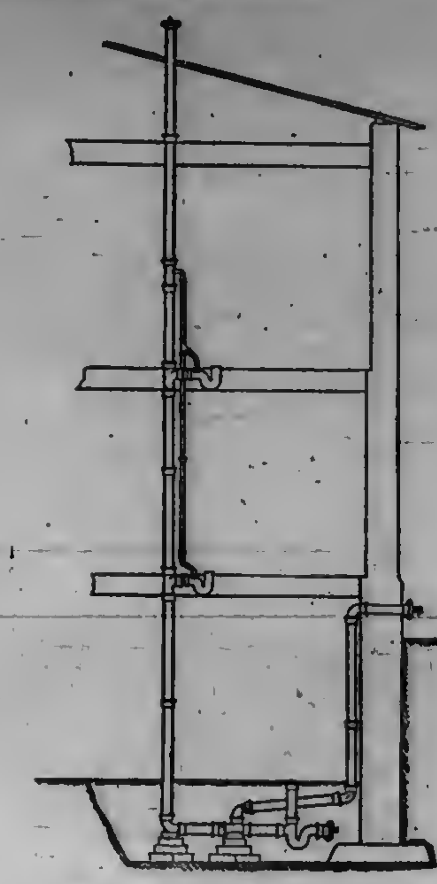


FIG. 2 shows the iron system of house-drainage complete, including the running trap and fresh air inlet; traps for water-closets and wastes for fixtures are all calked in, the traps wiped on to wastes and the wastes pinched together at top and soldered. A piece of heavy sheet-lead is soldered on top of the water-closet traps, the vent-pipes are connected with the crowns of trays, and the top and bottom of the soil-pipe are tightly capped, leaving the fresh air inlet open for attaching the pump. By this arrangement the whole of the system is under test, while, if the soil-pipe only was tested, there would still be two or three joints to be made for every fixture; this plan only requires one joint to be made after the test, and the danger of open work is much lessened.

In using this apparatus to test a system of plumbing it is necessary to have a two-inch, or a four-inch, iron plug with rubber gasket to fit on the shoulder of the fresh air inlet pipe, held in place by a clamp over the end of the hub, with a set screw in the center to screw down on the plug. Into one side of this plug is screwed a short nipple and cock to attach to hose from the pump. Cocks are arranged to prevent a loss of air from the pump, and show a loss of air through some leak in the plumbing if the indicator does not stay at the required point, fifteen pounds. If a leak is shown, a little soap and water applied to the pipe or suspected place, will show the position of the leak by the formation of a bubble.

Two New York plumbers were recently fined $750 each for defective work.

The Kingston Electric Light Company have ordered 650 incadescent lights to be used for lighting stores and private houses.

Winnipeg contemplates the construction of an extensive sewer system and other sanitary improvements calculated to reduce there.

Mr. Michael Hurley, Quebec, the patentee of an invention for heating railway trains by steam, has received an order from the government to introduce his patent into one of the Intercolonial trains.

Natnral gas has been conveyed into dwelling houses in the vicinity of Petrolea, Ont., and is said to afford a steady uniform heat for cooking. The method of using the gas is said to be to throw it on the wood and ignite it.

By request of the Dominion Government, Dr. Montizambert, guarantine officer at Grosse Isle, on the St. Lawrence river, recently paid a visit to New Orleans and made an inspection of the very excellent guarantine service maintained at that point.

Carefully framed by-laws similar to that now in operation in Toronto, regulating the manner in which plumbing shall be done, will serve to develop reading intelligent class of workmen, and weed out of the business the inferior men whose carelessness has destroyed the health and lives of many residents in large cities.

According to Dr. Hunt, secretary of the New Jersey State hoard of health, diphtheria is largely due to damp cellars which are suddenly heated in the fall, and his theory is verified by various reports where the disease has raged. It is claimed that during the summer in many cellars a good deal of vegetable matter is allowed to decay, and when the fires are started in the fall this decayed matter is stirred up and mingled with a peculiar dampness, which must be in the cellar, and it pervades the entire house.

One of the recommendations urged in favor of the use of electric lights in the interior of buildings is its great superiority in point of cleanliness over gas. It certainly does not coat ceilings and pictures with the grimy layer which gas burned in large quantities is sure to do. However, it is remarked at Washington that the use of the electric light has led to an enormous increase in the number of spiders' webs in public buildings of the city. The light attracts flies and moths, and insects, of course, attract the spiders. It is complained that in many cases the cobwebs cluster so thickly as quite to hide the ornamental details and to obscure the architectural outlines in the interior of the edifices.

BUILDING MATERIALS.

(Wholesale Prices.)

Foundation:		
Dimension		
Block		
Rubble		
Bluestone: (℔ sq. ft.)		
Sidewalk	30 @	5 00
Planed	50 –	6 00
Sandstone:		
Longmeadow		80
Kibbe		90
Brown, Connecticut	1 00	
Amherst, Ohio	90	95
Berea, Ohio	75	1 00
Berlin, Ohio	75	1 00
Belleville	80	1 25
New Brunswick and Nova Scotia		1 00
Caen		
Marble: (℔ cu. ft.)		
Lee, Mass.		
Rutland, white and blue		
Sutherland Falls	1 25	1 75
Glen's Falls, black		
Italian, blue-veined		
" sienna		
Tennessee, red		
" Knoxville		
Pennsylvania, blue		
Vermont, white		
Slate: Roofing (℔ square).		
" green	5 00	6 00
" " unfading	5 00	6 00
" purple	5 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me.	5 50	8 00
" black slate		7 50
Tiles, American, ℔ M.		
N. Peach Bottom, warranted unfading		

PAINTS. (In oil, ℔ lb.)

White lead, Can	6	6 50
" Can	6½	8 50
Red lead, Eng.	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" [illegible], Eng.	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (℔ Imp. gal.)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3½
Whiting, dry	75	1 00
Paris white, Eng., dry	1 25	1 50
Litharge, Am., "	6½	8
Sienna, burnt	15	20
Umber, "	8	12

BRICK.—℔ M.

Canadian, common (half and half)		8 00
" face		10 00
" hard (sewer)		8 00
" pressed		18 00
" moulded		30 00
Common: *Cargo afloat.*		
Pale		
Jersey	6 00	7 00
Long Island	7 50	8 00
Up River		
Haverstraw Bay, 2nd		7 50
" 1st		8 00
Hollow		13 00
Fronts:		
Croton, brown	10 00	14 00
" dark	11 00	15 00
" red	11 00	15 00
Chicago pressed		
" moulded		
Baltimore	37 00	41 00
Glen's Falls, white	30 00	35 00
Philadelphia	27 00	28 00
Trenton	25 00	26 00
Milwaukee		
Moulded:		
Clark's Glens Falls, red	25 00	27 00
" white	30 00	35 00
White " muld	45 00	60 00
Fire Brick, Ramsey T. Carr & Bute	25 00	28 00
Enamelled: *Imp.*		
Enamelled (edge)	85 00	100 00
Enamelled (edge and end)	90 00	115 00

CEMENT, LIME, etc.

Portland Cement	
Walsend, per bbl.	2 75
Francis & Son, "Vectis," "	2 75
Johnson's "	3 00
White's Cement, "	2 75
Queenston Canadian Cement, "	1 50
Grey Lime, per 2 bush. barrel, bulk	35
White " " " "	55
Hair, per 40 lb. sack	1 00
Plaster Paris, N. B., per bbl.	2 15

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$34 00 @	35 00
1¼ and thicker, three uppers, Am. ins.		40 00
1¼ and thicker, pickings, Am. ins.		30 00
1 x 10 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
1 x 10 and 12 dressing	14 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
1 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1½ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	15 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		14 00
1½ inch flooring	14 00	15 00
XXX shingles, sawn	$2 40 @	2 50
XX shingles, sawn	1 30	1 50
Lath, sawn		1 80

YARD QUOTATIONS.

Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		10 00
Shipping cull boards, promiscuous widths, stocks		13 00
Scantling and joist, up to 16 ft.		13 00
" " 18 ft.		14 00
" " 20 ft.		15 00
" " 22 ft.		16 00
" " 24 ft.		17 00
" " 26 ft.		18 00
" " 28 ft.		19 00
" " 30 ft.		20 00
" " 32 ft.		21 00
" " 34 ft.	22 50	22 50
" " 36 ft.		24 00
" " 38 ft.		27 00
" " 40 to 44 ft.		30 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board,	18 00	20 00
Dressing stocks	14 00	15 00
Picks, American inspection		30 00
Three uppers, American inspection		40 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 1 x 14, per M		11 00

B. M.

1¼ inch flooring, dressed	25 00	30 00
1½ " rough	14 00	15 00
1¼ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		2 25
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

ST. JOHN, N. B.

Iron, etc.		
Refined, ℔ 100 lb or ordinary size	2 25	0 00
Common, 100lb	2 10	0 00
Patent metals, ℔ lb	0 00	0 11
Anchors, ℔ lb	0 00	0 00
Chain cables, ℔ lb	0 03	0 06
Rigging chains, ℔ lb	0 03	0 3½
Lime.		
Casks	1 10	1 15
Lumber.		
Spruce deals, Bay Fundy Mills	8 00	8 25
Spruce deals, City Mills	8 50	9 50
Aristook P. B., Nos. 1 and 2	40 00	45 00
No. 3	30 00	35 00
No. 4	15 00	20 00
Aristook P. B. shipping	15 00	16 00
Common	12 00	13 00
Spruce boards	7 00	8 00
Spruce scantling (unst'd)	7 00	8 00
Spruce, dimensions	11 00	14 00
Pine clapboards, extra	35 00	40 00
No. 1	0 00	30 00
No. 2	0 00	20 00
No. 3	11 00	12 00
Laths, spruce	1 25	1 35
Laths, pine	5 50	8 00
Palings, spruce	5 50	8 00
Nails.		
Cut, 3dy, ℔ 100lb	3 75	0 40
Cut, other sizes	2 74	3 50
Ship Spikes	3 70	5 00
Galvanized	5 25	6 50

Decoration

A HANDSOME BUSINESS OFFICE.

THE illustration on this page shows the handsomely decorated interior of the private business office of Mr. J. Ross Robertson, proprietor of the *Evening Telegram*, of this city. In elegance of appointments and elaborate decoration, it is perhaps not equalled in Canada. The room opens off the main business office, and owing to the size of the latter, is necessarily small. It is L-shaped, and in order to relieve its smallness, one side of it is entirely framed with mirrors, which apparently enlarge the apartment. The transoms of the two windows looking out upon Bay Street, are of varigated stained glass, one representing steam and the other electricity, the former being a picture of three cherubs harnessing the vapor that floats out from the old tea kettle of Watts' vision, and on the other cherubs are

A Handsome Business Office.

snatching the lightning as it darts from the clouds. The windows are shaded with heavy plush curtains. The floor is covered with velvet carpet, while a chandelier of rich ormolu work depends from the centre of the ceiling. The ceiling and walls are hung with Lincrusta Walton. The general tone of the ceiling is buff, while the raised designs are of delicate lilac and pale copper bronze. The cornice, enriched with artistically wrought friezes, is olive shaded while the dull bronze of the lions' heads that adorn the upper frieze is relieved by electric blue which gives the room a bright and pleasant appearance. The decorative work was done throughout by Messrs. J. McCausland & Son, of this city. The furniture, a walnut suite, consists of a massive and handsome Wooten desk with comfortable writing chair and heavy library chairs in Morocco leather. Vases for flowers, photographs and various articles of *virtu* are placed about the room. Upon a mottled marble pedestal is a fine specimen of statuary called "The Coquette of Forence," while upon an easel opposite rest the etchings of "A Lancashire River," and "Breaking up of the Agamemnon." "The Old Politician," by Guzzardi, and other fine paintings decorate the walls. Within easy reach is a set of speaking tubes affording communication with every room in the building.

Contracts

CONTRACTS OPEN

OMEMER, ONT.—The Presbyterians contemplate building a new church.

KINGSTON, ONT.—The sum of $100,000 is to be spent in reconstructing the city water works.

LONDON, ONT.—There is an impression abroad that London needs a new city hall.

PARIS, ONT.—The erection of a new city hall to cost nearly $20,000 will probably be undertaken shortly.

HUNTSVILLE, ONT.—Tenders for the erection of a public school building to cost $5,500 will be called for shortly.

STRATFORD, ONT.—Stratford is badly in need of an opera house and steps will probably be taken in the spring to erect one.

SMITH'S FALLS, ONT.—Mr. John McLaren will build this winter a four storey brick hotel, 60 x 80 feet, to cost upwards of $10,000.

TRENTON, ONT.—The contract for the erection of a new post office in this town, has been awarded to Mr. Walter Alfred, of Belleville.

CALGARY, N. W. T.—It is expected that the Government will spend something like $100,000 in the erection of new police buildings next season.

HAMILTON, ONT.—As soon as the necessary sum of $7,500 can be raised to complete the building fund a new Y. M. C. A. building will be erected.

PORT HOPE, ONT.—Mr. Hamilton McCarthy, of Toronto, has been given the contract for the work on the memorial statue of the late Col. Williams.

BELLEVILLE, ONT.—$23,000 has been subscribed towards the capital stock of a company which is being organized to build a bridge over the Bay of Quinte.

WIARTON, ONT.—This town has contracted with Mr. J. Ronald, of Brussels, Ont., to build water works at a cost of $7,500, exclusive of engine house and docks.

BOWMANVILLE, ONT.—Public School Board are about to rebuild a school lately destroyed by fire, to include all latest improvements in heating, ventilation, &c.

AURORA, ONT.—Messrs. McQuillan & Co., of Parkdale, have the contract for putting in a system of water works here, the price, exclusive of the well and tank-house, being $8,600.

MOUNT FOREST, ONT.—The new high school building designed by architect Ritchie and built by contractor Gray of this town, cost $12,000, and is believed to be one of the most complete in the province.

NEW HAMBURG, ONT.—The Church of England congregation are raising funds, and will shortly begin the construction of a new church from plans supplied gratuitously by Architect F. Darling, of Toronto.

PETERBOROUGH, ONT.—Architect J. E. Belcher is preparing plans for a handsome summer hotel building, to be erected in the spring at Chemong Lake Park, about five miles from Peterborough, by a joint stock company.

LINDSAY, ONT.—The erection of a new post office to cost $40,000 and a collegiate institute to cost about $30,000 will be commenced here shortly. Contracts are now being let for many new buildings to go up in the spring. In fact this town looks forward to quite a building boom next season.

QUEBEC.—It is understood to be the intention of the Dominion Government to continue the carrying out of Lord Dufferin's scheme of embellishment for Quebec by giving out shortly the construction of Prescott and Hope gates to contract.

OTTAWA, ONT.—A new suspension or cantilever bridge cross the Ottawa river from the old ferry at Rockcliff to Gatineau Point, is being talked of. The bridge would be interprovincial, and its cost, which is estimated at $150,000, would probably be borne in part by the governments of the Dominion, Ontario, and Quebec.—Contracts for about fifty miles of the Oxford and New Glasgow railway have been let by the Department of Railways and Canals in four sections as follows: Sections one and three to J. O'Brien, of Renfrew, Ont., and Thomas Cooke, of Oxford, N. S.; section two to D. M. Sutherland, of Shubenacadie, N. S.; section four, to Archie Stewart and Ralph Jones, of Ottawa. The total cost of the four sections will be about $400,000.

MONTREAL, QUE.—A five-story stone and iron building is to be erected on the site of Nordheimer's Hall, St. James Street, to include three stores on ground floor and wareroom above.—The Canadian Pacific Railway Company will erect Mammoth Stables capable of holding 400 horses, for the accommodation of ranch horses in transit to England.—In view of a probable deficiency in the city water supply, during the present winter, the Water Committee will endeavor to secure a loan of $1,500,000 to complete the aqueduct, which would afford such a head of water as would make it possible to pump between 40 and 50 million gallons per day by hydraulic pressure alone, and more than double the present supply.—The C. P. R. Company will build large workshops in the east end of the city.—Contractors Davis & Sons, of Ottawa, will build the new C. P. R. depot on Windsor Street.—Several new hotels for Montreal and its suburbs will probably be commenced in the spring, a site having been selected in the centre of the city for a large commercial hotel. New summer hotels will also be built at Lachine, Belœil, and Lapmairie.

TORONTO ONT.—The Consumer's Gas Company will erect a two story brick retort-house to cost $60,000 and a purifying house to cost $40,000.—The City Council are considering the matter of establishing a Collegiate Institute in the Northwest part of the city.—A new agricultural hall will probably be built here in the spring.—It is proposed to spend some $40,000 in improvements to the exterior and interior of St. James Cathedral.—Wm. R Gregg, architect, 9 Victoria St., reports: Dwelling house on east side of Bellevue Avenue, near Oxford St., of red brick with Ohio stone dressings, for Jos. Gibson, Esq; residence for Geo. McKibbon, Esq., on the north side of Wilcox, near St. George St., white brick and brown stone; pair of dwelling houses on west side of McCaul St., near College St., also for Mr. McKibbon; pair of semi-detached houses of red brick, N. E. corner of College and Howland Place for Dr. McPhedran.

Manufacturing Materials.

A DEAD BLACK PAINT.

PROBABLY many of our readers, especially those who are the possessors of optical instruments, have, at some time or other, been in need of a "dead black" paint or varnish for brass work, such as tubes diaphragms, etc. We have often been in the same boat, and all the formulæ and recipes given in the books were unsatisfactory because of their vagueness. The following can be relied upon to give a first-rate dead black, and it is easily made: Take two grains of lampblack, put it into any smooth, shallow dish, such as a saucer or small butter plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lampblack together—about three drops of such size as may be had by dipping the point of a lead pencil about half an inch into the gold size will be found right for the above quantity of lampblack; it should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add 24 drops of turpentine, and again mix and work.

WARPING OF WOOD.

IT is said that the wood on the north side of a tree will not warp as much as that from the south side and that if trees are sawn in planes that run east and west, as the trees stood, it will warp less than if cut in the opposite direction. However this may be, it is certain that the tendency to warp when sawed into boards is much greater in green than in dry wood, and that the convex side of the curve is always toward the heart. This warping, due to unequal shrinkage, and to the more open texture of the external portion of the tree, is not found to occur in the middle plank or board of the log, excepting as it may in slight degree reduce the breadth. This quality of not warping, which is in many cases absolutely indispensable for certain uses, as, for example, in the sounding boards of pianos, is secured in the case of spruce timber by first quartering the logs, and then sawing them with the angle downward. It is then sawed into boards very nearly at right angles with the line of annual growth, and a small triangular strip must be taken off to make the board square edged, but qualities of stability and strength are secured that could not otherwise be had.

HOW MIRRORS ARE MADE.

ONE of the factories in Chicago employs 150 men and boys, and its spacious four floors present an interesting series of sights to visitors whose nerves are steel and tympani proof against splitting. On the first floor he will see huge stacks and piles of glass in assorted sizes ranging from sixteen feet by seven feet square down to the smallest ovals for mirrors. These are all polished, some being run over by huge felt-covered wheels kept powdered with rouge, and the larger sheets scrubbed by sweating toilers with hand blocks covered with felt like the printer's proof planer in rouge. After the glass is thoroughly polished it is taken up to the next floor, where it is laid on tables and cut into the sizes ordered. It then passes into the hands of the bevellers, who, with sand and water and large grindstones, artistically finish the edges of the glass. It takes a trip upward again, to another floor, and is once more put through a polishing process, to remove any scratches or blemishes that may be on the glass. After every spot or scratch, no matter how minute, has been removed, careful hands convey the now beautiful and sparkling glass to the room where it goes through the final process, the silvering. Huge tables of cast iron or stone made like billiard tables, with raised edges, are used in the silvering room. These tables are of great strength and solidity, and all round the edge is a drain, for the superfluous mercury is poured over the tables in quantities sufficient to float the glass, which, after being tinfoiled, is gently and carefully pushed across the table containing the mercury. Great care must be used to prevent blemishes, the least speck of dust being ruinous to the mirror. Mercury, like molten lead, is always covered with a dirty-looking scum which cannot be removed by skimming. The least bit of this scum would spoil the mirror, so the difficulty is obviated by shoving the scum along the edge of the glass. After successfully floating the glass on the mercury, a woolen cloth is spread over the whole surface and square iron weights are applied until the whole presents a compact mass of iron, two or three pounds to the square inch. After this pressure has been confined ten or twelve hours the weights are removed and the glass placed upon another table with slightly inclined top. The inclination is gradually increased until the unamalgamated quicksilver is drained away and only the perfectly amalgamated remains, coating the glass and perfectly adherent. This ends the process, and the erstwhile rough piece of glass emerges from the silvering room a gorgeous mirror.

TERRA COTTA AS A BUILDING MATERIAL.

THE recent introduction into Canada of terra cotta for building purposes, suggests a few remarks on the manner of its use, and its value for the purposes it is designed to serve. As a building material terra cotta is chiefly intended for decorative and protective purposes. It takes the place of expensive stone carving for exterior and interior decoration. As a fire-proof material, it ranks among the very best. Blocks or tiles of terra cotta may be used to advantage for roofs and walls of buildings inclosing a constructive frame-work of columns, posts lintels, beams, girders, rafters, etc., on which the support of the building depends. Mr. S. E. Lording writing on this subject in *Building*, says, "All the iron-work is encased in porous terra-cotta, tile, or brick-work. Slate, tile, and furring strips are nailed or screwed to this porous tile sheathing.

"The hollow or porous tiles or bricks forming roof and wall are faced with vitreous tile, slate, or other water and weather proof coatings, or with a single thickness of brick or tile. The interior faces of these porous terra-cotta tiles may be plain or paneled, and glazed, or finished with plaster, paint, etc. Any desired wall finish can be applied to this ground. The porous tiles forming the sheathing in roof and floor or wall are made spongeous, or like a pumice-stone body, by thoroughly and evenly mixing equal or various proportions of sawdust or other combustible or vegetable matter with pure clay. When carefully burned, to avoid sudden shrinkage or melting together of the particles of clay, the spaces left by the burning of the combustible materials form an open, spongeous body, that increases the value of the burned clay-work as a non-conductor, decreases its weight and its liability to crack when heated and cooled suddenly, and will allow screws or nails to be driven into this porous clay-work and securely fasten to this sheathing or groundwork the tiles, slates, interior furrings, flooring, etc., required in finishing and decorating the exterior and interior walls and floors. The use of iron or steel secures a light, strong construction, and when incased in porous terra-cotta or concrete, the combination forms a complete wall protection against any fire that would destroy this supporting frame-work.

"Above this fire-proof web or veil or wall, the furring strips or scantling of any required size may be placed, leaving the required spaces for water, gas, and heating pipes, etc., and supporting the wood or tile flooring or wall finish. This principle of construction applies to all stories. We started with the roof merely to show its special value there, the other floors that may be added only requiring the additional strengthening of the supporting columns as each story is added.

"Blocks or tiles, if of porous terra-cotta, also form the interior groundwork to receive both exterior and interior finish, making altogether a light, strong, fire-proof building. These walls, if supported in each story by this constructive frame, can be made much lighter. The whole structure will be as safe as a fire-proof construction; as, if heavier walls were built from the foundation extending through several stories, and heavy enough to support themselves, while they protect the constructive steel or iron frame-work which supports the floors and roofs of the building. With such a construction brick or stone work should not be used above the ground or foundations to support floors and roofs.

"The highest uses of clay and stone are to protect and to decorate, and when applied to these purposes, then massive or heavy walls of stone or brick will not or need not be built. Light walls of porous or hollow material, incasing and protecting a metallic or wood frame-work, will be used. These light walls, as stated above, may be as useful and still lighter, if they also rest upon and are supported by this iron or steel frame-work."

In the construction of ordinary dwelling houses for outside walls and inside finish it costs no more than for lumber but giving the additional advantages of a warm dry vermin proof building, impervious to sound, cool in summer, and at but small additional expense can be made absolutely safe from fire. The porous terra-cotta costs less for fire-proofing purposes than common brick, and architects' plans need but little if any changing either in details of construction or cost for application of this ware. Its cheapness and cost of application should warrant its use in hotels, places of amusement, public buildings warehouses and first-class dwellings. Its manufacture was first commenced in Canada by the Rathbun Company at Deseronto, Ont. Other companies have also been formed for manufacturing this line of material, and no doubt we shall see it coming into general use resulting in lower insurance rates and greater comfort and security to our people in construction methods in the direction indicated above.

It is estimated that over $100,000 worth of granite was shipped from New Brunswick to Ontario purchasers last year.

An incendiary attempted to set fire to Esplin's sash and door factory, in Montreal, recently, but fortunately his plans miscarried.

There is reason for the belief that in the near future, glass and paper will take the place of many building materials of the present day.

Messrs. Snider & Steckle, of Plattsville, Ont., have placed a new engine in their brick and tile yard in anticipation of a large trade next season.

From the village of Rockwood, Ont., large quantities of building stone are shipped to Toronto, Brantford, Stratford, Berlin, and other places.

A granite tile 800 years old, taken from the tomb of William the Conqueror at Caen, Normandy, was recently on exhibition in a show window at Detroit.

It is reported that there has been discovered near Tilsonburg an immense bed of marble, side by side with the finest sands for building or paving purposes.

Mr. E. Buchanan, of the East Selkirk, Man., stone quarries, reports a poor demand during last season. He burned 5,000 bushels of lime which sold at 15 to 20 cents per bushel.

The Canadian Granite Company, of Ottawa, are preparing a tablet designed by Mr. Louis Fearer, and executed in gray granite, which is to be erected over the graves of Osgoode and Rogers, two sharpshooters who fell in the Northwest rebellion.

There is a large supply of building stone, pronounced by architects to be of good quality, in the vicinity of Selkirk, Man. Specimens of it may be seen in the monument on the market square, in the post office, Winnipeg, and other important buildings.

Mr. B. V. Stafford, of Arnprior, lately finished a handsome altar and credence table for the Anglican church in Torbolton. They are built of walnut and red oak. He has also manufactured a set of three chairs in walnut and fine hair plush for the pulpit of St. Andrew's church, Arnprior.

The manufactory of the Asphalt Paving Co., at Ottawa, was totally destroyed by fire on the morning of the 1st of December last. The contents of the building were also burned. The company gave employment to fifty hands. The loss amounts to about $10,000; with insurance of only $4,500.

Persons who may not know the nature and color of black birch after dressing and polishing may be interested in knowing that the grain of the wood is very close, the color mottled and slightly darker than satin wood. Black birch makes beautiful furniture, and the only complaint made against it for house trimmings is the care and extra time required in nailing the boards, to prevent splitting.

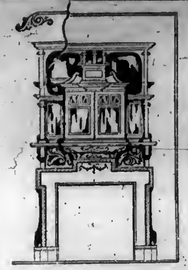
A NEW BUILDING MATERIAL.—A new building material called stone brick, harder than the hardest clay brick, is made from simple mortar, but a scientifically made and perfect mortar; in fact, a hydraulic cement and the grinding together of lime and sand in a dry state—including also some alumnia, which is usually present in sand—and the subsequent heating by steam, give the mixture the properties of the burned hydraulic cements at present in use.

The Montreal branch of the International Terra Cotta Company, is now in active operation. The company manufactures porous earthenware, terra cotta lumber, brickwood, cellula pottery, etc., and their goods bid fair to enter largely into the buildings of the future. They show samples of blocks for exterior walls, covered with a perfect water proofing which closes the pores of the material, and prepares it for receiving coatings of paint in any ornamental style to suit. These blocks are as smooth as the pressed brick that go into the construction of buildings, and when laid in walls have the appearance of dimension stone.

Mr. John Radigan, of Hamilton, Ont., has lately patented and commenced to manufacture a circular corner metallic lath, a few particulars of which may prove interesting to architects and builders. The purpose of this invention is to provide a reliable ground for plastering on, in forming round corners or stud partitions, and also in forming circular plaster columns. It is claimed that this metallic lath having no spring or shrinkage, will prevent cracking or breaking of the plaster. These metallic laths are made the same depth and thickness as the ordinary wood laths, so as to break joint with them, and are made curved inwards on the outer edges to form an effective key to hold the plaster. Rounded corners of any required radius can be made. Each lath is formed of strong sheet iron rigidly curved, and is held on by nails at each end driven into the stud, and can be used to form both convex and concave corners. In curves of six inch radius, the corner or angle stud can be dispensed with, and the ordinary angle head is not required. Seven of these circular metallic laths form a foot in height on the partition, leaving the ordinary key between them.

Some years ago, says a contemporary, the following whitewash was used on the east end of the White House, and is as good to-day as when first applied: Take one half-bushel of nice unslacked lime; slack it with boiling water, cover it during the process to keep in the steam. Strain the liquid through a fine sieve or strainer, and add to it a peck of salt previously dissolved in warm water, three pounds of ground rice boiled to a thin paste, one-half-pound of powdered Spanish whiting, and one pound of clean glue which has been previously dissolved by soaking it well, and then hang it over a slow fire in a small kettle within a larger one filled with water. Add five gallons of hot water to the mixture, stir it well, and let it stand for a few days covered from dust. It should be put on hot, and for this purpose it can be kept in a kettle on a portable furnace. It is said that about a pint of this mixture will cover a square yard on the outside of a house if properly applied. Fine or coarse brushes may be used, according to the neatness of the job required. It answers as well as oil paint for wood, brick, or stone, and is cheaper. It retains its brilliancy for many years. There is nothing of the kind that will compare with it, either for inside or outside walls. Buildings or fences covered with it will take a much longer time to burn than if they were painted with oil paint. Coloring matter may be put with it and made of any shade desired. Spanish brown will make a reddish pink, when stirred in, more or less deep according to the quantity. A delicate tinge of this is very pretty for inside walls. Finely pulverized common clay well mixed with Spanish brown makes a reddish stone color; yellow ochre stirred in makes yellow wash, but chrome goes further and makes a color generally esteemed prettier. It is difficult to make rules, because tastes differ. It would be best to try experiments on a shingle and let it dry. Green must not be mixed with lime, for it destroys the color, and the color has an effect on the whitewash which makes it crack and peel.

Mr. John Page, Chief Engineer of Canals, will arbitrate upon the claims of Mr. A. P. Macdonald for extras in connection with his contract on the Tay Canal.



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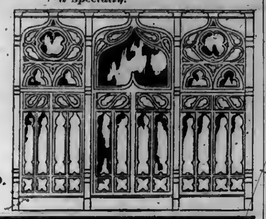

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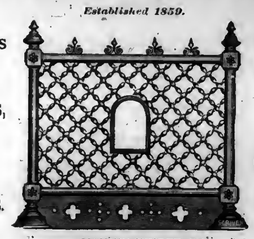

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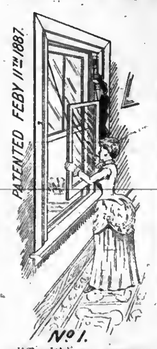

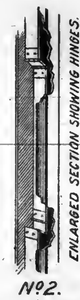

It is singular, but nevertheless a fact, that in the almost innumerable inventions of the 19th century, it has been left to the year 1887 to present to the public a simple device, whereby any person can take out a window sash without the use of screw-drivers, chisels, hatchets, or some other tool to remove the stops which are more or less defaced and injured in so doing. A few removals show the wear and tear they are subjected to with almost a certainty that they will not be placed back again in exactly the same position they were taken from. The window becoming loose, rattles and annoys. When cleaning is required, a person jeopardizes life and limb by getting out on the window sill of the second, third, or fourth story for that purpose. If glazing is needed, often a ladder must be brought into requisition. By the use of this simple invention all the above difficulties are overcome. Fig. (1) illustrates the sash being removed with perfect ease. Fig. (2) is an enlarged view of the section which is inserted in the side of the frame; the window is raised to the point showing the indention, then pressed gently to the right, when section (2) recedes into the frame sufficiently to allow the sash to clear the stop on the opposite side; when the cords are detached and attached to the hooks on the face of the frame, the sash can then be taken to the kitchen and washed without making slops around the carpet. The action of the hinges throws section (2) immediately back flush with the casing. The upper sash is provided for and removed in the same way. The attention of architects and builders is called to this invention. Its simplicity and utility recommends itself at a glance. No person building but will adopt it. It can be inserted in old frames with little expense. To the trade, architects and builders, hinges will be supplied at $1.50 per dozen pairs. Send for sample dozen and test their utility. The patent for sale in county rights, or entire Dominion. For further information, apply or address—

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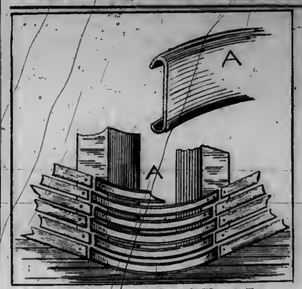

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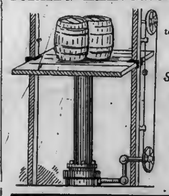

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The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

IN reply to numerous enquiries received at this office, the publisher will send the CANADIAN ARCHITECT AND BUILDER to clubs of six to ten subscribers at $1.75 per year for each copy.

IT would be a matter of great satisfaction, if some manufacturer would undertake to supply the Toronto building trade with a first-class brick. The bricks which we are now obliged to use are very inferior in material, hardness and shape. A good, hard, deep-colored square brick, with sharp and well defined arrises, would command a good price for first-class work.

THE Trent Valley Canal Commission has been organized, and is about to enter upon its duties. The principal factor in leading the Commission to decide for or against the completion of the canal, must naturally be the question, will it pay? Apart from this main consideration, there should be taken into account the large sums of money already expended on the work, and the advantage to the country of having canals as competitors of the railways for the carrying trade of the Dominion.

IT speaks well for the Hamilton plumbers that they have decided to petition the Council to appoint an Inspector of Plumbing. At present, it is said, many people are willing to run all the risks incident to bad plumbing, if only they can get work done at a cheap figure. Under such circumstances, the Council should not hesitate to make the appointment, which would ensure good work being done at fair prices, and prevent the spread of disease, which must inevitably follow a continuance of the present condition of things. Every city should have its Plumbing Inspector.

PERSONS engaged in any of the various branches of construction work are invited to make free use of the columns of this journal for the purpose of expressing their opinions on any matters affecting their profession or calling. There are many wrongs that need to be righted, and that might be righted if the nature of them was publicly explained. An instance of this came to the notice of the writer the other day. A plumber was complaining that the ideas of a certain architect on the subject of plumbing, and especially in regard to the weight of pipe which the plumber should use, were absurd, and if carried out would not serve any useful purpose. Without taking sides with either the architect or the plumber on the question in dispute, we simply desire to say, that if a wrong exists the plumber can have it righted far more speedily by publicly exposing it, than by grumbling about it privately. Let us have your opinions, gentlemen.

IN presenting to the public the second number of the CANADIAN ARCHITECT AND BUILDER, the publisher desires to state that the reception accorded to this new journal has been of the most cordial character. Much that was crude in its contents and arrangement has been generously overlooked, and words of praise and encouragement have been bestowed unstintingly. Subscriptions and requests for sample copies have come in by almost every mail. In fact the stock of papers reserved for these requirements—and which it was thought would be ample for the purpose—ran out nine or ten days ago. Persons applying since that time have been asked to wait for the present number. This is a most gratifying state of affairs, and augurs well for the future success of the enterprise. To our *confreres* of the daily and weekly press we are deeply indebted for many kind references to this paper. In returning sincere thanks for the kindly greeting and support accorded to our initial number, we simply desire to add that for the future our best efforts shall be put forth to make this journal of the highest value to its readers. To attain this object, we shall require, and shall hope to receive, the active assistance of persons engaged in the various branches of construction work.

A DAILY paper, in calling for a Dominion Employers' Liability Act, says: "In outside occupations the neglect in regard to the limbs and lives of employees is not less marked. Scaffolding in Canada is as a rule flimsily constructed, and the workman has the choice of risking his life upon it or leaving the job." This statement is only partially correct. It is true that scaffolding is often put up in a flimsy manner. But who puts up the scaffolding? As a rule the workmen who are to use it, and to whose carelessness may frequently be attributed the accidents which all deplore. It is safe to say that the number of master builders who would knowingly risk the lives of their employees by compelling them to work on insecure scaffolding, is extremely small compared with the number of careless workmen who, to save themselves a little trouble, perhaps, voluntarily assume such risks. Instances have come under our personal observation where master builders in this city repeatedly warn workmen in their employ against exposing themselves to danger unnecessarily, and not unfrequently accidents are the result of a careless disregard of such warnings. In such cases, no attempt should be made to saddle the responsibility upon the employer.

IT is seldom a movement is inaugurated and brought to such a successful issue in the short period of one year, as that of the Canadian Society of Civil Engineers. Formerly the science of engineering in this country had been looked upon as one in which anybody could engage. Of late years a great change has taken place—Schools of Engineering have been inaugurated in several provinces, in which education of the highest order has been imparted to their students and graduates. The fruits of this are apparent already in the magnificent works to be found in all parts of the Dominion. It is only a natural sequence that men of such high intellectual calibre, should desire to band together for mutual improvement and interchange of ideas. The gentlemen who were most deeply interested in the welfare of their calling, who occupy the highest places in the profession, have come forward freely and placed their time and talents at the disposal of the Society. The Society has been particularly fortunate in enlisting the sympathies of such eminent men as Messrs. F. C. and S. Keefer, Gzowski, Kennedy, Hannaford, Wallis, Page, Perley, Schrieber and others, and in having for their first secretary such an organizer as Prof. Bovey, of Montreal. Under the constitution, branches can be formed at different points. We know of no place better suited for one than Toronto. We have not yet heard of any steps being taken to form one, and will be much disappointed if resident members do not at once avail themselves of their rights, and found a branch in this city. With a School of Engineering in our midst, it would seem a foregone conclusion that a vigorous branch should flourish here.

WE must protest against the daily newspaper giving the opinions of a man on architectural questions who is unwilling to have his name mentioned. The *Globe* the other day gave what it stated was the opinion of a "prominent architect" on the "Court House Muddle." As it did not give his name, how do we know he is as represented? Are we to take the opinion of a reporter on the standing of an architect, when the public seem to be generally unable to judge of an architect's qualifications? At any rate, if this person is so prominent an architect, and was so willing to give his opinion, he should also have been equally willing to give his name, so that we might be able to give due weight to his statement by a knowledge of the man. We think that we can speak for nearly all the prominent architects, and we have no hesitation in stating that not one of those with whom we have the honor of being acquainted would make the statements attributed to this "prominent architect." The giving by a newspaper of the opinions of Tom, Dick and Harry, on subjects of which they know nothing whatever, or of the opinion of a man who may have some general knowledge of the kinds of work involved, but who has no information of the particular work or the proposed mode of carrying it out, is unfair and unjust to the parties interested, and may be the means of doing them much injury. But when these opinions are given without the names of the parties, the action on the part of the newspaper is entitled to the strongest condemnation of all fair minded men. The opinion of no man, no matter who he may be nor how much he knows of the subject under discussion, should be given without his name. We would not prevent a writer giving information when possible, but would prevent him quoting some not to be disputed authority.

WE should like to see printed copies of a fire by-law distributed among those interested in the building trades. From what we can make out, we would not advise that the present by-law be printed before it is revised. It seems to have been drawn up

in a hap-hazard convenient sort of way, to save thought or trouble on the part of the framers. Why we should have the same restrictions placed on construction of buildings erected in the residential and thinly built districts as on those in the business and thickly built portions, we cannot understand. We wish to see all reasonable provision made to prevent the spread of fire, but can see no use in regulations which do not check the spread of fire, but do restrict the erection of artistic and home-like houses for our people. What would the residential parts of Buffalo or Detroit be like if they had a fire by-law similar to that of this city? Would you see the cheap and artistic homes which are the pride of American cities, if they had tyrannical fire by-laws which would compel them to build in brick or stone only? Where would be the tile, shingle or clapboard gables and projections, which give such pleasing relief to their homes? Where would be the neatly and artistically painted wooden dwellings, of which they are so justly proud? We have no hesitation in stating that they would not have such homes any more than we have, if their architects were unnecessarily interfered with in the designing of this work by similar fire by-laws—a fire by-law which is useless where it should be effective, and most irksome where not necessary for protecting from fire. Let us have a common sense by-law which will prevent the erection of fire traps in the business and thickly-built portions of the city, and yet will allow of safe fire-resisting construction in the dwelling house districts, although the same may not be of stone or brick or sheet iron coverings. Would some one connected with the framing of the fire by-law inform us how many dwelling houses have been burned in this city during the past ten years which would not have been burned if they had been constructed under the requirements of the present by-law?

THE erection of a suitable Court House appears to be a difficult problem for our aldermen. It seems to us that the matter has not been approached in a proper manner. It is first decided that the building is not to cost more than a certain sum—which is absurdly inadequate—without any reference to the accommodation required, or the dignity or self-respect of the city.

If we had had this question to decide, we would have gone about it in this manner: We would have first determined whether the building is a necessity. If we had decided in the affirmative, we would have then considered the accommodation required by the present wants of the city, and what further accommodation will be necessary owing to its future growth. It would be folly to erect a building of such limited capacity that the business of ten years hence could not be transacted within its walls. Having fixed upon the accommodation, we would then consider the mode of construction to be adopted. Shall it be a cheap and flimsy building, subject to rapid deterioration and requiring large annual outlays to keep in a habitable condition, or shall it be a substantial structure which will stand the wear and tear of time? Shall it be a fire-trap, or a fire-proof building where important documents may be safely kept? And lastly, we would take into consideration whether the wealth and importance of the city requires that the building shall be ornate or simple in design. A poor community, without artistic pretentions, may erect a cheap barn-like building without any loss of self-respect; but such can not be the case with a wealthy and presumably artistic people. Their wealth and love of art will justly be judged by their public buildings. It therefore becomes them to erect what will be a true and faithful reflection of their wealth and artistic perception. An artistic design does not always result from a large expenditure of money—very often the reverse—but a too limited appropriation may preclude the possibility of producing a beautiful building. Therefore, to allow of an artistic result, we would advise the expenditure of a sufficient amount, and take every precaution to obtain value for our money. To find out what is a reasonable expenditure, is the problem, and one which can only be solved by careful study, by men competent to deal with all the questions involved. It is absurd to find fault with a building in the construction of which money has not been wasted or stolen, because it is not grand enough or large enough, and yet to complain indignantly of its cost. Many imagine that the chief duty of an architect is to produce for $50,000 what can only be done properly for $75,000 or $100,000. And yet these same people will be the first to grumble at the imperfection of the cheaply-constructed building. If an architect could call to his assistance "Alladin's Lamp," he might be able to accomplish this most difficult feat; but as he has it not, nor is possessed of an immense fortune which will allow him to subscribe the difference between the amount placed at his disposal and that required to satisfy the ambition of his client, he fails. We are free to admit that architects are often wasteful of their clients' money, but so far as this city is concerned, they have not had many opportunities.

We would advise our City Council to take hold of this problem properly, and to that end to appoint a commission of three experienced and competent men, whose sole duties will be to make themselves acquainted with the requirements of such a building and direct its construction. A committee whose *personnel* is changing every year, and which is composed of men who have not the time, if they had the necessary qualifications, to acquire a thorough knowledge of all the questions involved, and thus be able to make intelligent decisions, is not a proper body to entrust with such an important work, requiring so much attention to details. An architect has sufficient duties to perform without being obliged to assume those properly belonging to his client. With a commission composed of men who thoroughly understood the questions, he could receive necessary instruction and directions, and not be obliged to proceed in the dark, hoping that what he does will meet with the approval of his clients. This commission would be able to judge of the expenditure necessary for the proper carrying out of the work, and could restrain any extravagant tendencies of the architect.

The appointment of practical men to look over the plans and specifications is a move in the right direction, but it does not go far enough. They will not be able to enter into all the questions involved. The Council should go further, and make certain that the building which is proposed is suitable in all respects, and will meet the needs of the city. To our mind it is not so much the question, at the present time, of the architect's plans and specifications being suitable from the practical point, as it is whether the information supplied to him is correct, and he has properly met the requirements. We believe that the architect is able to carry out the work satisfactorily if he is properly instructed as to the accommodation required, and definitely directed in all matters which his clients or their representatives should assume the responsibility of. The expenditure of so large a sum should not be proceeded with without full consideration. Time and money spent in carefully going over every question involved in the erection of this building before a single stone is laid, will give us much better results than one hundred or one thousand times the same outlay in either or both when the building is partly or fully constructed.

We have not the least sympathy with those who are apparently working against the architect by trying to place on his shoulders the mistakes which have been made by the building committee. He is not responsible for the difficulties of the situation, but those who, by their incapacity and lack of judgment, have let the matter drift along without any intelligent supervision. We have no doubt as to the architect having done the best that could be done under the circumstances, and therefore we urge that he should be given a fair opportunity to show what is in him, under the control and with the assistance of a competent commission. We believe that the plans are very good, and the design all that could be desired, and that if built they would reflect credit on the architect and on our city architecturally. When the architect has done so well, do not cause him to ruin his designs in bringing the expenditure within an inadequate amount for the erection of a good building, nor allow him to badly plan portions of the building under misconceptions as to the requirements. In conclusion, we would urge our aldermen not to spare money nor time in the preliminary work necessary to the erection of a court house which should be a credit to the enterprise of our citizens and a correct exponent of their appreciation and love of art.

Since the above was written, the experts appointed by the Court House Committee have reported that the plans and specifications prepared by Mr. Lennox were full and complete. They made but one recommendation, and that, the manner of specifying the stone for the foundation walls. The change suggested is not important to the construction of the building, but will render the preparation of tenders much less difficult for the contractors. It is very satisfactory to know that the architect has prepared his work thoroughly.

DECORATING GLASS.

WHAT is sand-blasting?" asked a Chicago *Herald* writer of a man whose life has been spent in decorating glass.

"The grinding or decorating of glass with sand—a secret process, the inside facts of which we cannot disclose," replied the expert. "Come up-stairs and see a sand-blast machine." The machine suggests a cider mill in shape, or a cheese press. The glass is laid on rubber belts at the side, and is then fed into the machine. As soon as it disappears from view some rubber flaps come down and prevent the pressure in the interior from escaping. This pressure is exerted by wind and sand—a 20-horse power engine being required to raise the "blow" which drives the sand to the glass. Looking through the window in the centre of the machine a "gun" is disclosed. It has a large mouth-shaped opening, at which it is loaded with 20-horse power ammunition of wind and sand. Before the ammunition is allowed to leave the gun, the aperture narrows to about one-sixth the width of the loading point. This condenses the sand so that when it leaves the gun it strikes the glass with such force as to eat into the surface. When the glass has been exposed it passes out of the machine on rubber belts at the opposite side. This process is called grinding, and one machine will grind about 900 sq. ft. in a day.

Now for the decorative part. Suppose the sandblaster wishes to present on a square of glass a certain design. He simply covers the surface with beeswax and a certain mixture laid on over the glass in exact duplicate of the design required. The glass passes into the machine. The sand is fired from the gun, but this time it grinds only the exposed parts. The portion covered with beeswax and the secret mixture is not touched by the sand and when the plate emerges from the machine, and the wax, etc., are washed off, behold the design standing out in sharp contrast to the ground surface which the sand has scarified.

This is the A B C of sand-blasting. The process is susceptible of much elaboration, and one improvement, which was patented last year by a Chicago gentleman, is called the "amograph." The pictures are first drawn on the back of the glass by the artist with a color which will resist the action of the sand blast. It is then subjected to the stream of sand, which cuts the glass in all parts which are not covered more or less by the resistant. The resistant is then washed off clean, leaving the pictures cut into the glass. They are next silvered over, if desired, to give greater brilliancy. The effect is that of a multiplicity of colors, but no paint or coloring of any kind is used, the effect being obtained by the different shades of the glass itself.

PERSONAL.

James Russell, builder, London, Ont., is dead.

Racette & Bousquet, contractors, Montreal, have dissolved.

The Toronto plumbing inspectors were last month voted an increase of salary.

Mr. A. P. Macdonald, contractor, of this city, has gone to Bermuda in the hope of restoring his health.

Mr. Wm. Gerry, builder, of London, Ont., was recently presented with a beautiful parlor lamp by his employees.

The marriage of a son of Mr. Walter Shanley, Government Engineer, to Miss J. Conroy, of Aylmer, Que., was one of the events of the past month.

The firm of J. & W. Britton, builders and contractors, Teeswater, Ont., have dissolved partnership by mutual consent, J. Britton continues the business.

The sudden death is announced of Mr. E. R. Moore, proprietor of the St. John Nail and Tack Works. Mr. Moore made the first steel nails manufactured in Canada.

Architect Jos. W. Power, of Kingston, has been confined to his house by illness for some time past, but is now, we are glad to learn, able to attend to his duties again.

Ex-Ald. Joseph Hook, a well-known builder and contractor of London, Ont., assigned last month. He is said to have lost heavily by his contract for the Military School.

Mr. Gobeil, Secretary of the Public Works Department, has been in poor health for some time past, and last month started on a trip with the object of recuperating strength.

Mr. W. G. Ritchie, plumber, on the occasion of his marriage last month, was presented by his father's employees with a handsome marble clock and statuntry, accompanied by a kindly worded address.

Architect David B. Dick, of this city, has been suffering for several weeks from injuries received by falling from a ladder. His friends will be pleased to learn that he has so far recovered as to be able to spend an hour or two each day at his office.

The election of Mr. Thos. C. Keefer, of Ottawa, Ont., to the Presidency of the American Society of Civil Engineers is an honor bestowed upon Canada, and a well-deserved recognition of eminent services in the field of engineering, extending over a period of nearly half a century. Mr. Keefer, who is 67 years of age, is a Canadian, having bren born at Thorold, Ont. He has been identified with many of the largest works of construction in connection with the opening up and development of this country, having had charge of such undertakings as the Erie Canal, Grand Trunk, Montreal Waterworks, Hainilton Waterworks, and many others. He was a commissioner to the Paris Exhibition, is an officer of the Legion of Honor, and a C. M. G.

THE ARCHITECTURAL GUILD OF TORONTO.

A NUMBER of the architects of this city have formed themselves into an Association called the Architectural Guild of Toronto. The Guild has been formed through a feeling among the architects that there should be some means of bringing the members of the profession together in a friendly way to discuss matters of interest to themselves and their clients. The Guild has been very successful, all the members taking a deep interest in the proceedings. It meets once a month, when a dinner is partaken of before any business is transacted. After the good things provided by the host have been disposed of to the great advantage of the physical wants of the members and the producing of goodfellowship, general business matters are discussed in an informal manner. All sorts of questions are considered—matters in which the architects are directly interested and their clients indirectly, and also matters in which the respective positions are reversed. Five meetings have been held, at which the attendance has been good and the events unmistakeable. The membership is now twenty-four. Mr. S. G. Curry, of Messrs. Darling & Curry, is Secretary-Treasurer. It is hoped that the Architectural Guild of Toronto will prosper until it has developed into an incorporated Association of Architects for the whole of Canada, similar to the Institute of British Architects.

THE ARCHITECTURAL DRAUGHTSMEN'S ASSOCIATION.

THE addresses which are being delivered before this Association at present by some of the master mechanics of the city are proving, as was expected, very instructive. The knowledge gained from the experiences of skilled mechanics in the building trades, must be of great value to the young architect, and the opportunity afforded by these addresses of acquiring valuable practical information in the different branches of building should be embraced by every student of architecture. Since our last issue the regular weekly meetings at the Canadian Institute have been spent as follows:

On Jan. 17th Mr. M. J. Hynes gave an interesting and thoughtful talk on the subject of Terra Cotta. He began by giving a short history of this material, showing how it had been employed from earliest times and by almost all nations with the most lasting results, thus proving its durability. He then gave a description of the methods of construction of the terra cotta kilns, and also described the peculiarities and uses of the various kinds of fire clays, and the different varieties of pressed bricks, encaustic tiles, etc.

On Jan. 24th a paper on "Renaissance Architecture" was read by Mr. Frank Douglas. The history and distinctive features of this style were clearly set forth, and ably criticised in the discussion by the members which followed. Mr. Douglas expects to leave shortly for Scotland, and the Association will lose a valuable member by his removal, as he has always shown a deep interest in its welfare.

January 31st formed the second of the trade nights. Mr. J. B. Vick was present and gave a very practical talk on the subject of stone dressing and setting. He described the tools employed and their uses, the different kinds of stone and their uses, the various ways of finishing and the proper method of setting work.

On February 7th there was no programme, but instead an open discussion. The most useful books for an architect's library were discussed, the different members present giving their views.

The meetings of the Association are held every Tuesday evening in the Canadian Institute, corner of Richmond and Clare streets, and a cordial invitation is extended to every one interested in the subject of architecture.

AN APPEAL FOR ORGANIZATION.

"By Constans Fides."

NOW that your journal has been started, it will be in order to urge upon the members of the profession to at once push into existence again the apparently defunct "Canadian Institute of Architects." Permit me to give a slight history of the past. Somewhere about 1856, I forget the exact date having lost the papers, an effort was made by a few gentlemen, amongst whom were Mr. Brown, of Kingston, Mr. Wm. Thomas, of Toronto, and some others, to start a Society of Architects for the Province of Ontario. I was invited to join, which I did after its formation. Mr. Brown was elected President, and Mr. Thomas Vice-President. By-laws were made, and a schedule of professional fees were published. After its establishment, certain parties who called themselves surveyors crept in and so ruled affairs that they caused the Society to collapse. Perhaps there are some now alive who can give the cause and reason of its short lived existence. In 1876 an advertisement was inserted in two Toronto papers calling for a gathering of the profession to discuss the advisability of forming an Institute. About nine or ten met in the Society of Arts rooms on King street, Toronto. It was decided to form a society. A secretary was named; a few meetings subsequently took place; committees were appointed, By-laws, &c., drawn out, and a tariff of fees adopted. Illness prevented the writer from attending regularly and finally illness prevented him from taking any active interest in its affairs. Since recovering his health he has several times tried to find out what has become of the Institute. A note was addressed to the secretary asking to be informed what had become of the property, for property there was, several volumes having been given to the Institute. No answer has been returned to the enquiry. This is a matter of surprise and regret, as common courtesy at least should mark the conduct of members of our profession. No one of the many hundreds of my fellow students of former days in London, Paris, Rome and Berlin, had I written to them on the slightest matter in connection with the profession, but would have replied instantly and courteously. Indeed I have some pleasant contrasts to the discourtesy of which I complain in letters from old fellow students from Chicago, New York, and Baltimore.

Entrance to Medical Council Building, Toronto.

I am aware that our profession is not held in the highest esteem by the outside public, but this is the fault of the members themselves who exhibit such jealousy of one another that it causes all this indifference to them. I am quite sure that if we could establish a "Canadian Institute of Architects," there would soon spring up a spirit of kindness and goodfellowship, that a strong and permanent good would be the result. I well remember what pleasant meetings we had in the days of my studentship, when we used to gather together in the evenings each bringing his sketches and memoranda of his day or week's work. These gatherings were frequently attended by professors and elders, who would offer us friendly criticism and advice. How pleasant and profitable would such meetings be, if we had an Institute of Architects where such gatherings could take place.

Let some energetic members of the profession in Toronto start the formation at once. The young students, I have no doubt, would soon join, and would find it to their mutual advantage. There would soon spring up a united body who would place the members of our noble profession on a sound foundation. Remember that architecture is the root from which all the art orpfessions have sprung, and it is our duty to resuscitate it here in Canada to its proper and legitimate position. Such organization is necessary, not only in order that the dignity of the profession may be maintained, but also that by means of the united action which could thereby be secured, Canadian architects might protect their rights.

I see in the first number of the Canadian Architect and Builder a letter in which it is pointed out that a Judge of one of the Courts stated that he could only allow an expert witness of the profession the fee of a mechanic (I believe it is 75 cents), for his day's attendance at the Court. I myself fought against this monstrous injustice years ago. I had been employed on an inspection of a quarry, taking levels of the waste stone used, made plans and a report. When I had done, I put in my account, including my assistant's time, chainman and other expenses. On being informed that I could not claim more than laborer's or mechanic's pay, I refused to go into Court at all. This matter culminated in my going to Toronto and appearing before the then presiding judges, Chief Justice Draper, Judge Robinson and Judge Burns, and asking leave to address the Court, which was granted. I stated the whole case and was listened to, much to the astonishment of the barristers. The judges admitted that the tariff was unjust, and said it would be altered. I was told to bring the matter before the judge at the next assizes in Hamilton, which I did. Judge Burns presided, and recollected my having appeared before him and the other judges, and on handing up my account he at once indorsed it and I was paid. I am surprised to find that this unjust tariff at Osgoode Hall still exists. Why should lawyers or any other body make our tariff? We must take the matter in hand and help ourselves. We are now quite a numerous body, and there are clever educated young men enough in our ranks to secure for the profession the necessary Act of Parliament authorizing the profession to charge regular fees and pass such laws in our organization as will regulate all the matters complained of. If we are united as one man there is no doubt of success. I have written this more as an appeal to my fellow profesionals to put aside any spirit of jealousy that may exist, unite for the common good, and our Canadian Institute of Architects" will soon be a fact.

WHAT ARCHITECTURE IS, AND WHAT IT IS NOT.

THE President of the Western Association of Architects in his address at the annual convention held at Cincinnati, in November, thus defined architecture:

"Architecture is not a system of incoherently uttered and illogically occurring fashions.

Architecture is not a "fad" which is respectable today because it apes the work of some great man to whose creations it is comparable only as a jackdaw is to an orator.

It is not architecture in whose name we dare erect to-day rough and brutal piles of stone, whose only merit is the roughness, and which to-morrow we will spurn from us as unkempt tramps of things.

Architecture is the material expression in stone and iron and brick, of an idea, dominating, consistent, coherent; source and inspiration of ten or a thousand thoughts, but giving character to all. As such it can afford to lose sight at no instant of one thought by its great apostles and prophets.

These traditions, which have lived for centuries, are not to be venerated for age alone, but for their truth; they are not sacred because of their age, but are old because of their truth. All architecture based upon mere caprice is less enduring in the history of art than a breath."

At the next regular meeting of the "Architectural Draughtsmen's Association of Toronto, to be held on the 21st inst., a paper will be read on "Drawing," by the President, Mr. Robt. Dawson; and at the meeting on the 28th inst., Mr. Wm. Simpson will present a paper on "Joinery."

OUR ILLUSTRATIONS.

THE NEW YORK LIFE INSURANCE COMPANY'S NEW BUILDING.

THE handsome new building about to be erected on the corner of St. James Street and Place d'Armes, Montreal, for the head office of the N. Y. Life Insurance Co., forms one of our principal illustrations this month.

The building will have a basement, sub-basement and eight storeys. The two fronts will be of Scotch Gatelaw Bridge sandstone, and all the piers in basement and basement front are to be of Thousand Island red granite. All the brick and stone work will be set in cement. The inside finish of wood work is to be of polished cherry, and the floors will be laid with Georgia pine, and polished.

The building will be perfectly fire-proof, the stair-case to be of iron, with marble steps, and all corridors to be laid in tile. Size of building, 71 x 112 feet; architects, Messrs. Babb, Cook & Willard, of New York; contractors, Simpson & Peel, of Montreal; and the following sub-contractors: Mason work, Peter Lyall; brick work, T. W. Peel; iron work, E. Chanteloup; plastering and fire-proofing, J. McLean; painting and glazing, W. P. Scott.

DESIGN FOR COTTAGE COSTING $3,000.

We give in this number, in geometrical elevation, interesting views and plans of new designs for cottages.

The cottages are built of timber, framed and sheathed with 1-inch boards, and weather boarded over a lining of heavy weather-proof paper. The roofs are covered with I. X. charcoal tin, with standing seams.

Modern improvements, understood to be a bath-room, and kitchen with the usual fittings for hot and cold water supply, wash bowls, water-closet, tubs and boilers, with tank and cistern supply, are among the conveniences secured to these elegant cottages, at a moderate cost.

The wood work is chiefly pine, stained and varnished to preserve the effect of the natural grain. The foundations are stone and brick, the cellars cemented, brick cisterns, and soil drains.

The cost of the two cottages, built together, is estimated at about $5,800. To erect a single house would cost probably $3,000.

MEDICAL COUNCIL BUILDING.

The new Medical Council building which forms one of the leading illustrations in this number is situated on the corner of Bay and Richmond streets in this city, and is being erected for the Medical Council of Ontario from plans and under the supervision of Mr. E. J. Lennox, architect, Toronto. It is five stories in height, and has a frontage on Bay street of 88 feet by a depth on Richmond street of 95 feet. First two stories are built in heavy Credit Valley coursing stone. Top three stories are built of Carlton face brick, Credit Valley stone dressing, and relieved with ornamental cut brick and cut stone panels executed in Scotch sand stone. The roof is covered with terra cotta tiles. The entire structure is very substantially built. The interior is partially finished in hardwood. The building has all the latest improvements—first-class elevators, large hall and stairways, thoroughly ventilated and heated by direct low-pressure steam. The cost of the structure will be about $75,000.

RECESS AND FIRE PLACE FOR HALLWAY.

By Geo. G. Booth.

VENEERS.

SOME of the finest veneers are still made, by preference, with the saw, notwithstanding the results obtained by knife machines. Woods like ebony and lignum-vitæ cannot be cut with a knife, while finely-figured and consequently close-grained mahogany is also difficult to cut by other means than the saw, the latter having to be, necessarily, very thin, and so finely adjusted that hardly the slightest variation shall be possible in the thickness of the veneers turned out. While a nicely arranged circular saw will turn out boards varying the twentieth part of an inch, which would be imperceptible, such a lack of uniformity in thin sheets would prove a damaging imperfection. The amount of steaming required by various woods to be made into veneers, differs considerably. Thus it is stated, an ordinary wood like black walnut, which has an open grain, will steam sufficiently in six hours, while the close-grained South American woods require 36 hours. Mahogany, tulip and rosewood, being hard to cut, require more and careful steaming and a knife in the best condition.

The capitol building at Albany, N. Y., which is but two-thirds finished, and upon which $19,000,000 has been expended, is said to be in danger of tumbling down owing to the strain from unequal support.

CIVIC ENGINEERING.

THIS is a wide field of increasing importance embracing hydraulic, mechanical, electrical, gas, railway and road engineering, that is water supply and sewerage, electric lighting and the electric railway, the elevated and the cable railway and pavements, any one of which is the subject for a separate and extended essay. I can, therefore, only refer to a few questions in connection with each.

Water supply and drainage or sewerage, on account of their influence on the health, protection and comfort of the citizens, are first in importance. Every epidemic is immediately ascribed to the water supply or the sewers, although typhoid and diphtheria are often more prevalent in country districts, where no fault can be found with the water or the drainage. It is an annual plague in the Rocky Mountains as well as in the Panama or Roman marshes. This outcry has given rise to a new name in our profession, the Sanitary Engineer. The jurisdiction of the City Engineer does not extend into the houses. With the best arrangements, eternal vigilance is the price of exemption, and as we cannot tell how everything is working if not always in sight, and when sealed up by ice and snow, I believe the only safety is in providing for the worst. Wherever this gas can get in, make a way for it to get out,—ventilate the exposed rooms as well as the sewers.

Undoubtedly there is much room for improvement in the drainage of our towns—both as to streets and houses—but the best systems for both assures us no guarantee against the ravages of an epidemic. The health commissioners have ascribed the recent epidemic at Ottawa, to the water, not because they discovered anything wrong in it—but because they could find no other solution of the question. We cannot even suggest a remedy until we know the cause. Experts are not agreed upon that—the drainage, the water supply, the heat, the drouth, and deficient supply of electricity in the atmosphere, have, one or more, in turn been held responsible. As all, with the same exposure, are not victims, the individual constitution must be an element in the question. If the existing cause can be located upon the terra firma, engineers may be able to deal with it,—but if it is in the air we must remember that it can get there from the four quarters of the compass as well as from under our feet, from above as well as from below, and this will go on in spite of all our efforts until the last vial is poured out into the air.

Periodical outcries against the water are accompanied by demands for filtration at the works. Filtration has two sides,—you "hive" all the impurities in a limited space, and compel all the water to run the gauntlet through them. Frequent cleansing of the filter beds would be necessary, and how is this to be accomplished with the thermometer 20° below zero? We cannot cover acres and heat the enclosure to handle ten millions of gallons daily. Of this ten millions, two per cent. or less may be used for drinking and culinary purposes. Filtration, therefore, like ventilation should be done in the houses by those who demand it, and they must see that, by daily cleansing, they get the water in as good condition as it comes to them.

The Insurance Companies are reminding us that fire protection should be a leading consideration in every system of water supply. In gravitation supplies like Quebec with sufficient elevation, and in pumping supplies where water power is used, as in Ottawa, this result is obtained without additional cost. But where steam power is required, as in Toronto, the best fire protection—that from direct pressure from hydrants—is secured only by increased consumption of coal. The people there complain of their coal bill, but if it were less their insurance bill would be greater. They compare their consumption of coal with cities which do not lift the water half the height to which it is lifted in Toronto.

Our principal cities, Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton and London, have very efficient systems of water-supply, in respect to quality and pressure. As compared with the older systems in New York, Philadelphia and Boston, our pressure is greater and our use of steamers for fire is less. We pay more for pumping and less for fire insurance. With the exception of Winnipeg, Vancouver and Belleville, all our cities own their water-works. Quebec, Halifax, St. John, St. Catharines, Victoria and Vancouver have gravitation supplies. Montreal and London have water power supplemented by steam, with distributing reservoirs. Ottawa has water power exclusively; continuous pumping without stand pipe or reservoir since 1874, and without any failure in the supply. Both pumping power and mains are duplicated, because, with a single pump and main, in the absence of a reservoir, a break down of either suspends the delivery instanter, and in toto.

Brantford, Guelph and Stratford pump by steam, Peterborough, Port Hope and Lindsay by water power; the two latter for fire purposes only. Brampton has a gravitation supply. In Stratford and Port Hope the water power is used at nights for the electric light. This is also done in Victoria, where, with a gravitation system, the high levels are supplied during the day by steam from the electric light boilers. This economical arrangement is only applicable, for constant supply, where there is a reservoir and sufficient pumping capacity to keep it filled by working only during daylight.

Vancouver's gravitation supply is only commenced. The water is brought from a mountain canon—nearly ten miles distant—through steel pipes 22 and 16 in. diameter, and carried across an arm of the sea in 60 feet water by a cast iron flexible jointed pipe. The fountain head is 430 feet above tide, the highest parts of the city being about 250 feet lower than the source of the supply.

There are a number of other Canadian towns and villages which have water works. I trust we will receive a full account of them, as well as of those mentioned, through local members of this Society.

An economical and ingenious method of supplying a limited number of houses above the distributing reservoir head, has been in successful operation in Burlington, Vermont, for the last six years. An hydraulic motor is inserted in the pumping main near the reservoir, the water surface of which is 289 feet above Lake Champlain, the source of supply. Two ten-inch rising mains connect the pumps and reservoir passing through the city. The distributing pipes are fed from these mains, receiving from pumps, when in motion, and from reservoir when pumps are standing, the pressure on the motor being greater on the pump side when the latter is working, and upon the reservoir side at other times. When the reservoir is full the head is between 12 and 13 feet, and the pressure a little over 5 lbs. This motor raises the water 60 feet, and delivers it through a mile of pipe into a tank having an overflow pipe into the main, so that no water is wasted. The speed of the pump worked by this motor varies from 5 or 6 strokes per minute in the night, to 22 strokes per minute in the day time. The cost of this application was under $2,000.

Mild steel is competing successfully with cast iron for mains, rivetted for the larger sizes and lap welded for 12 inch and under. The strength and security is greater, and the cost on the whole less, because of the lighter weights, longer pipes, fewer joints, and lesser cost of transportation. Cast iron, however, maintains its supremacy for all purposes of distribution on account of the facility and economy with which connections can be made with it. Its greater durability on account of its greater thickness also checks the extension of the use of steel.

I can only direct attention to the great works going on for the further supply of New York, Liverpool, Kansas City, San Francisco, etc., and to the rapid extension of water supply to the smaller towns and villages on this continent. This last is the result of the organization of large water companies, having like the bridge companies able engineers. A contract is made securing an efficient fire service for a stipulated annuity from the corporation.

This secures the whole or the greater part of the interest on the outlay and the companies trust to other consumers to make up any deficiency. Many towns prefer to pay an annual subsidy to undertaking the works, in some cases because they are unwilling to entrust their representatives with their construction. Belleville has agreed to pay an American company 3½ per cent. on an estimated cost of $200,000, for the construction of water works.

I am not aware of the formation of any company in Canada for this purpose. If our unsupplied towns have not wisdom enough to construct and own the works which should pay them as well as it pays a company, capitalists and engineers may do a good thing for themselves and the country by showing them how it can and ought to be done.

SEWERAGE.

The foremost question in connection with sewerage is whether the combined or separate system should be adopted for new towns or for new extensions in older ones having the combined system. For house drainage, sewers require a deeper excavation than is necessary to get rid of surface water, and are therefore very costly when large enough for both purposes. The combined system is necessarily weaker in form and therefore more exposed to damage from excessive rain fall. Much depends upon climate and surface inclination of the streets, as well as the relation between the street grades and basement openings in the buildings. Before towns are sewered all the water is carried off upon the surface, but with level streets and particularly in Northern towns when the snow is melting fast there is a necessity for rapidly relieving the streets by underground drainage, in order to prevent flooding of basements. In the sewers of the combined system, the gas is diluted by contact with a larger body of air and water, and these sewers are flushed by the rain fall, but at irregular intervals which are too long in the dry season of summer and the cold one of winter. In the separate system, the pipe sewers are flushed automatically, and at frequent intervals at all seasons; but for this purpose water must be provided although comparatively little is required.

The separate system being much cheaper than the combined will doubtless be adopted where the question of cost is decisive, and surface water can be disposed of as before.

Our new city of Vancouver has adopted the separate system for which all the conditions are favorable, a mild climate, excessive rain fall for six months, and good grades for rapid removal of surface rain fall.

The needs of this city were so urgent that they could not wait for metalled roadways, or for sewer pipes from Glasgow by the long voyage around Cape Horn. They therefore have covered their roadways with plank, and made their sewer pipes of the same material, with rubber joints, for which when necessary earthenware pipes will be substituted, all man holes, etc., being monoliths in Portland cement.

The proper disposal of sewage, is the great question in other countries, especially where the discharge causes river pollution or endangers the source of the water supply. Chicago is extending her tunnels four miles into the lake, instead of the two miles which were considered sufficient to escape the pollution of the lake shore, by her "cloaca maxima" the Chicago River.

Toronto is agitated over intercepting sewers, pumping, and sewage farming. The utilization of sewage to diminish the cost of its diversion from the natural outlets is limited by local conditions. Clarification and irrigation both involve pumping, and the latter is only practicable where large areas of low, level and cheap land are to be obtained.

No system can surpass the discharge into large flowing rivers, or large bodies of water, and where those are the sources of the water supply, the best and cheapest course is to remove the intake of the latter to a safe distance.

The removal from the streets of garbage and rubbish, which may be washed into sewers, and the cremation of all combustible trash, is attracting deserved attention in towns where this new departure is needed. This cremation is as old as Jerusalem, where the fires in the Valley of Hinnom were never quenched.

PAVEMENTS.

The gradual approach to the old Roman method of roadway is

*Extract from annual address of President Thos. C. Keefer, C.M.G., before the Canadian Society of Civil Engineers, Montreal, Jan. 12th, 1888.

the result of increasing wealth and intelligence in our large cities. I give the precedence to wealth, as intelligence is useless without it. It is money and men with us, while with the ancients men were plentiful and a little money went a long way. In fact the men had to do the work whether the money was forthcoming or not. The knights of those days were not Knights of Labor. Our practice has been to veneer the graded surface with a shallow coating of stone or wood, as well,—or otherwise (and sometimes otherwise) as the money would warrant; but, chiefly for want of a proper foundation (which is the expensive part) there was no durability. A temporary system is in fact the only one applicable to growing towns. The constant breaking up of streets for gas, water, drainage, tramways, etc., is the great drawback to a permanent system. The wooden block pavements were no sooner completed than they were chopped through for these purposes and the statu quo could not be restored in the necessarily hasty refilling of the trench. There is apparently no limit to this;—larger gas and water pipes may be required, and telegraph, telephone, and electric light wires must yet go under ground, and it must go on until we can afford permanent sub-ways as in Paris, and then all connections can be made without breaking through our pavements. All street work for all purposes should be under one city control. Where two or more parties have the right to open the streets, there is no remedy for injury done but the unsatisfactory one of litigation.

TRAMWAYS.

Electricity as a means of propulsion for city railways is making great strides in the United States to the south and west of us, where it dispenses with stables, but in our climate it is only available about seven months in the year. It is more efficient and in some cases more economical than horse power, but whether it will prove so for our car season only will depend on the traffic. The horse stock and stables must be retained, and the former must either go to other work or be sent to grass.

The cable system for the same reason is shut out from Eastern Canada, but both it and the electric are available when they can be afforded on our Pacific Coast. An elevated railway is the only one upon which continuous car traffic can be maintained on our streets throughout the year. This city is forced by the mountain to extend chiefly along the river, and I think that an elevated road between Cote St. Paul and Hochelaga will become a practicable enterprise in the near future.

CANADA AND THE PANAMA CANAL.

By R. Bourne, C. E.

NOW that De Lessep's great work is within two years time of completion, and that all nations are witnessing, as the audience in a Roman theatre, his resolute struggle—desperate as that of any gladiator of classic times—against huge natural and financial difficulties, and preparing to take their proper parts in using an undertaking of such world-wide advantage as it is, it behooves Canada to consider carefully her relation to the scheme, and to make the needed prepartions for using this notable water highway at the earliest moment.

Ever since the discovery of the two continents of America, the Isthmus of Panama has been seen to be an important commercial centre by many thoughtful observers, and efforts have been made to gain a footing there with a view to founding on it a trading emporium for the world. Situated as it is, where the continents narrow together, and offering the prospect, which De Lesseps has been grasping, of shortening vastly the route for the many vessels trading between one coast of the Americas and the other, and to busy ports in Australia and the East, these attempts are not to be surprised at.

Of the latter, one of the first and most worthy of note was made by one of whom all true Scotchmen may be justly proud—well known as "Willie" Patterson, who in the reign of William of Orange tried to plant a colony of his countrymen on the Isthmus of Darien (as it has once been named) and to found the city of New Edinburgh. Having traded for some years in Central America, and been an unwilling officer of a buccaneer ship for a length of time, he had become fully versed in the capabilities of the place. After being granted a charter by the King, he was much hindered by the jealousy of English and Dutch merchants; and, having made an heroic effort to hold his ground, was forced by the unhealthiness of the site chosen by him, and other misfortunes, to abandon his enterprise. Returning by Jamaica, he was refused help for his now few disease-wasted colonists, by Williams, governor of the Island—the ex-buccaneer chief, Henry Morgan.

This historic digression is needed to shew that, if thought of so much moment by one of the most far-seeing and able men of his time, (Patterson originated the Bank of England and the use of bank notes) the commercial use of the Isthmus deserves more earnest attention at this time, when the trade passing it, and the number of ports to be benefited by its being opened up, are so much increased. After the above effort, attention has from time to time been directed to the Isthmus (the U. S. government in particular, having through its Presidents given such projects as the present its warm support) culminating in the founding of the towns of Aspinwall and Panama, and the building of the railway crossing it.

A few points need to be touched on to prove that the Panama Canal may well be a channel of profitable carriage to Canada. First, a glance at the map shews that the ports of Eastern Canada will be brought much nearer to such places as San Francisco, Valparaiso, Melbourne and Shanghai, being much farther from them than eastern ports in the United States—a few hundred miles being of great moment in trade competition now-a-days. Secondly, Canada may find it much to her advantage to gain a traffic by sea between her own eastern and western ports, particularly in articles that cannot readily be carried by the C. P. R. Thirdly, Canada's grain, superior to any other on these continents, her excellent timber, valuable metals (either crude or turned into machinery), and various manufactures of goods needed by the peoples of the lands more nearly reached by the new route, may be sold, on utilising it, to much greater advantage than they can possibly be sold now.

The next question, and that a most vital one, to be raised is: can Canada, particularly central Canada, have a more direct and cheaper access to the canal than as at present? Most undoubtedly she can, and that by a route which should have been opened up long ago, viz, by way of Lake Michigan and the Mississippi. It must be known to many of the readers of this journal, that the subject of a water junction between the above has gained the attention of not a few thinking men in the United States for some years past, and that the different movements in favor of this project are now about being culminated by its taking a national form. One of the means for effecting this object is the cutting of a canal to join the lake with the Illinois River, a scheme which the map will show to involve no lengthened distance, and will point out a route plainly provided by nature for supplying not only the majority of the Central States, but all of Canada within reach of the great lakes, with a cheap and easy outlet to the South. And, so evident is nature's provision in the matter, that the wonder is how the people of the United States, so forward and enterprising as they usually are in such matters, should have allowed all these years to slip by without effecting this much needed purpose.

The next operation for the completion of the scheme will be the improvement of the channel of the Mississippi by removing a number of the obstacles to navigation in it, such as sandbars, snags, wrecks, &c. Of the last named, it has been proved in evidence before a Committee of the United States Senate that no less than 5000 have been sunk in the river between St. Louis and Cairo alone—a distance of from 200 to 300 miles—and seldom removed; any of the worst of the natural obstructions named have been caused by the standing of a log which the labor of a few men would have cut away in a short time. For removing these obstacles, a sum of money beyond the reach of almost any private company must be expended; but if this great enterprise be undertaken by the U. S. Government, there should be no difficulty of this sort.

Now that this undertaking, so momentous in its relations to Canada, is under way among our neighbors, it is high time that Canadian statesmen and writers should strengthen their hands, by urging on the rapid beginning of the work, and by strongly advocating it in the press of Canada.

MONTREAL.

(Correspondence of The Canadian Architect and Builder.)

Montreal is at last awakening to the fact that something must be done to keep pace with the requirements of a metropolis, and much is being said and done concerning immediate improvements.

The City Improvement Association has been inaugurated by the leading business men of the city, and judging by the amount of money and influence offered, a Montreal "boom" of considerable extent is certain. Definite plans for the general improvement of the whole city are being adopted, and steps will be taken to immediately develop them.

It is the purpose of the Association to open boulevards east and west, to widen the principal thoroughfares and plant trees on residential streets, to make good roads and even sidewalks, and to reorganize the system of drainage. These and many other needed improvements are promised and will no doubt be carried out.

Another very important matter under consideration is the enlargement of Montreal's harbor. Plans showing the enlargement ordered by the Harbour Commissioners have been prepared by the Chief Engineer. It is proposed to build a series of large pier wharves at such an angle as to afford easy access to vessels from the strong current outside. If these plans are carried out the capacity would be: Deep water wharfage, 27½ feet at low water, 45,000 feet; deep water wharfage, 20 feet at low water, 1,460 feet; shallow water wharfage, 10 to 20 feet at low water, 4,360 feet. Total, 850,950 feet.

Railway matters, with reference to the Canadian Pacific Railway's new depot and their entrance into the west end of the city, are receiving considerable notice. It is proposed to cross the streets by handsome one-span segmental arches of stone, from which there will be no droppings, and hardly any noise.

The Mount Royal Elevated Railway Co., are about to submit full plans and specifications of their scheme to the City Council, and will ask permission to erect a double track on Craig, St. James and Notre Dame streets. They propose two columns in the middle of the road, leaving space between for the tracks of the street cars to run.

The Grand Trunk Railway Co., are about to make improvements in the way of subways and bridges in this city which will cost in the neighborhood of half a million dollars.

The Governors and Committee of the new Protestant Insane Asylum have approved of the plans submitted by J. W. and G. C. Hopkins, architects. The estimated cost for a building to accommodate 200 patients, will be about $125,000.

Mr. J. Keenan, of New York, has just completed the contract for eight magnificent new houses to be built on Sherbrooke street. The buildings will be three storeys in height, with a basement, —and will be finished in November. They will cost about $10,000 each. Messrs. Hutchison & Steele are the architects.

BUILDING PROSPECTS FOR 1888 IN HAMILTON.

(Correspondence of the Canadian Architect and Builder.)

THE building prospects for the coming season are very good, and architects have already a fair share of work in hand in preparing plans for commencing operations. There is the new city hall to be built, which will engage a number of hands during the year, and the erection of other large buildings are also in contemplation, among which may be mentioned a new factory for the manufacture of dessicated cocoanut. Then there are quite a number of renting or tenement homes in contemplation, the plans for which are in course of preparation.

But it must be borne in mind just here—and this is the matter which most concerns architects and master builders (and the workmen as well if they can, and will only see the point)—that all the speculative works, such as houses to rent, and which are of course expected to pay a fair interest on the capital invested, may be checked in the start, and the contemplated extent of work stayed, by any of the inopportune strikes among the workmen that are so likely to take place, and which should be so universally dreaded, more especially by the workmen themselves, who generally have the largest share in the disastrous consequences. But although there is some talk of a claim for an increase of wages in the building trades, it is hoped that the unions, profiting by past experience, will wisely order matters so as not to awaken discussion of the matter of a strike in the public prints, because, even if the parties intending to build should have their plans prepared ready for tendering on, they will surely hesitate in letting the contract, being generally under the impression that it is wise to wait until matters quiet down to their normal condition when they feel that the work may be done at a lower cost; and moreover, contractors cannot possibly make a safe estimate of work, in contemplation of a possible strike during the progress of it. It is to be hoped that those most interested will take this matter into their deep consideration, and take immediate action to prevent the difficulties of past seasons. Of course this matter concerns every city in the province as much as Hamilton, and if care is taken to prevent disputes between employers and employees, the prospects of a successful and profitable season's work are very satisfactory and at the close of the year you will have a fair record to make of the new buildings erected in this ambitious city during the year 1888.

I am glad to see that the Canadian Architect and Builder is working its way well among the architects and building fraternity who will without doubt soon recognize and appreciate it as the best medium of profitable communication and enlightenment on all matters connected with the building interests. It is especially noteworthy that the students and apprentices are ingeniously seeing into and prospecting on the advantages to be gained by them by reading the articles that appear in this journal from time to time, and which they know they are at liberty to comment upon whenever they may feel disposed to do so.

HINTS TO BUILDERS.

DON'T inclose the sick—no place in a kitchen is so much neglected.

Porch floors should be of narrow stuff and the joints laid in white lead.

Lime-water is fire-proof protection for shingles or any light wood-work.

Common brick absorb a pint of water each, and make a very damp house.

The lowest priced builder is not always the cheapest as poor work will testify.

A closet finished with red cedar shelves and drawers is death to moths and insects.

Do not locate a furnace register next to a mantel, that is, if you wish to utilize the heat.

Terra cotta flue linings are a great improvement over the old roughly plastered chimney.

For basement flooring, oak is preferred to maple because it will stand dampness better.

To properly select the colors applicable to the proper place, consult an educated painter.

A ventilating flue from the kitchen into the chimney often does away with atmospheric meals.

Stops to doors and windows should be fastened with roundhead screws, so as to be easily moved.

It is better to oil floors than to paint them—a monthly rubbing will make them as good as new.

Do not use one chimney flue for two stove pipes—the draught of one will counteract that of the other.

Do not finish windows to the floor—the circulation across the floor is one of the causes of cold houses.

Ash pits in cellars under fire places and mantels save taking up ashes, for they may be raked down through a hopper.

Do not construct solid doors of two kinds of hard wood—the action of the atmosphere on one or the other will cause the door to warp.—*California Architect and Building News.*

Stratford is counting on a building boom in the spring.

Building operations will be very brisk in Exeter, Ont., next season.

Architects Kennedy & Holland are erecting a new drill shed at Barrie, Ont.

Building operations promise to be brisk at West Toronto Junction next spring.

The total cost of the new Government buildings at St. Thomas is $69,667.30.

The building outlook for the coming season at Peterboro' Ont., is very promising.

A new public school building costing $14,000 was opened at Wallaceburg last month.

Building operations will be conducted on an extensive scale in Milverton, Ont., and vicinity during the coming season.

The City Council of Belleville will probably take $30,000 worth of stock in the proposed bridge across the Bay of Quinte.

The C. P. R. authorities deny that the recent railway accident near Jackfish Bay was caused by weakness of the trestle-work.

In the new G. T. R. engine shops in course of erection at Lindsay, Ont., there are 33 large double windows holding 3,300 panes of glass.

The appointment of two inspectors to superintend building operations in the interests of the Toronto Public School Board, is talked of.

Reports from London, Ont., indicate that the prospects for builders and contractors for the coming season are all that could be desired.

Since the C. P. R. reached Ayr, Ont., the town has commenced to grow rapidly, and many building enterprises are projected and under way.

The estimated cost of completing the Trent Valley Canal, is $8,684,650.

The city of Vancouver, B C., has 13¾ miles of graded streets, 5½ miles planked, and 1 mile gravelled, and 18¾ miles of broad, plank side-walks.

The building of the new iron railway bridge at Fredericton, N. B., has just been commenced. It is proposed to complete the work before the opening of the river.

The Minister of Public Works declined to comply with the request of a deputation from Goderich asking that the specifications for improvements to the harbor at that port be changed.

A flourishing Engineering Society exists in connection with the Toronto School of Practical Science, at the meetings of which able and practical papers on engineering topics are read.

The work of constructing a ship railway across the isthmus of Chignecto will be resumed next summer. Mr. H. G. C. Ketchum, of Fredericton, N. B., is the promoter of the undertaking.

Slowly but steadily the work of building the great St. Peter's Cathedral, in Montreal, progresses, although the building is still far from completion. The statement of receipts and expenditure in connection with its construction from March 1st, 1885, to October, 1887, shows receipts $69,956.84, and expenditure on building, $72,488.93.

Contractors for city work in London, Ont., are condemning the new regulation of the Works Department which requires them to lay twenty feet of pipe before covering it up. They contend that the carrying out of this regulation will be found to be practically impossible in springy ground, will nearly double the cost of construction to the city, and endanger the lives of the workmen to a far greater extent than at present.

The arbitrators appointed to decide the proper division of profits between the members of the Company who built "Section B" of the C. P. railway, have apportioned the amounts as follows: Alex. Manning, $49,875; G. McLaren, $44,235; J. J. McDonald, $48,168; J. Chester, $9,500; A. Shields, $38,052. The sum of $12,500 was allowed McDonald for commission he paid into court to the credit of the suit of Shields v. McDonald. The arbitrators' fees amounted to $3,000.

The French Minister of Works is said to be in favor of Admiral Clode's plan for bridging the English channel, and is trying to induce the British Government to assist in carrying out the gigantic scheme. It is proposed to rest the bridge on concrete piers. The height of it is to be 40 metres, thus enabling the largest vessels to pass under it, and is to be built of iron. It is to start from Cranaux-Œufs, south of Cape Grisaez, and run in a straight line across the channel to Folkestone, this distance not being the smallest, but offering the least depth of water.

In most if not all American cities, work which necessitates the digging up of the roadways, ceases as soon as severe frosty weather sets in. Such is not the case in Toronto. The work of constructing sewers and private drains, and of laying gas and water pipes, has been going on uninterruptedly during the present winter, in spite of the severity of the weather. Certainly the progress made is not so rapid as in summer but a means of livelihood is afforded to the laboring classes, some of whom would otherwise be a burden on public charity during at least a portion of the winter.

The amount spent by the government last year on public buildings in the various provinces is as follows:

	Amount available.	Expended in 1886-7.
Nova Scotia	109,974	76,714
Prince Edward Island	54,736	48,150
New Brunswick	95,190	77,980
Quebec	275,296	236,206
Ontario	829,173	718,808
Manitoba	165,100	109,511
Northwest Territories	217,815	163,527
British Columbia	131,263	40,518
Public buildings gen.	17,394	13,199
Total	$1,886,456	$1,485,381

An event of more than ordinary importance was the formal opening for traffic on the 18th of January of the new interoational railway bridge at Sault Ste. Marie. The structure, which was built under the direction of Messrs. G. H. Massey and R. G. Reid, civil engineers, of Montreal, has ten spans, each 242 feet in length and weighing about 250 tons. There are two spans of 105 feet across the main channel. The draw is next to the largest bridge in the country. The style of the bridge is a "pin truss." It is sixteen feet above the water. The trusses extend upward forty feet. The main bridge is 2,420 feet in length, is joined by 2,000 feet of trestle work across the island and then two spans of 105 feet each across the north channel. The entire length of the structure, swing, main bridge, trestle, and all from abutment to abutment on the main land on either side, is 5,490 feet. The cost of the structure was about $700,000.

A premium of $40,000 dollars is offered by the republic of Buenos Ayres, South America, for the best design of a capital building to be erected in that country. The date for submitting drawings is set for April next.

The New York legislature at its last session, with a view to improving the standard of public school buildings as regards their adaptability for the purpose they are intended to serve, decided to offer prizes ranging from $50 to $150 for plans and specifications for school houses to cost from $600 to $10,000. Fifty-eight designs were submitted. Those accepted are said to be artistic in design, and the arrangements regarding light, heat and sanitation, show a great improvement on structures at present in use. The accepted plans have been photographed for distribution wherever there is need of such plans for school-houses to be constructed.

UNION, ONT.—S. V. Wilson will build a new woolen mill.

ARTHUR, ONT.—A $5,000 convent is to be erected here next summer.

BRANTFORD, ONT.—The Courtland Carriage Co. will shortly begin to build a factory.

ELMIRA, ONT.—The Roman Catholics of this place will build a new church the coming summer.

PHILLIPSVILLE, ONT.—The Evangelical Association will build a brick church the coming spring.

CHELTENHAM, ONT.—The old Presbyterian church is to be torn down and a new one erected.

WINNIPEG, MAN.—It has been decided to make extensive alterations to the Mackenzie Hotel.

SEABORT, ONT.—The Methodists of this place contemplate erecting a new church the coming summer.

LONDON, ONT.—City Council will probably erect a new building to serve as headquarters of the fire brigade.

RAPID CITY, MAN.—Plans have been prepared for a new Masonic hall building, 24x50, two stories high.

WOODVILLE, ONT.—The Methodists have material on the ground for the building of their new church in the spring.

ORILLIA, ONT.—There will be a lot of building done here next summer, all the buildings put up last year being occupied.

PETERBORO', ONT.—The contract for the erection of the new Nicholls' Hospital has been awarded to Mr. Arthur Rutherford.

AURORA, ONT.—J. Fleury's Sons are getting material on the ground for building large additions to their works in the spring.

THOROLD, ONT.—The Council is considering the matter of erecting a new town hall. For particulars address the town clerk.

BELLEVILLE, ONT.—Architect E. J. Lennox, of Toronto, is preparing plans for improvements to John Street Presbyterian Church.

GUELPH, ONT.—Some capitalists are talking of erecting a $20,000 opera house on the site of the recently destroyed Commercial Hotel.

KIRKTON, ONT.—Messrs. Ross & Taylor, of Exeter, are preparing plans for the new Methodist Church to cost $5,000, to be erected here next summer.

KINGSTON, ONT.—Increased school accommodation is urgently required, and new buildings will probably be undertaken shortly. —The congregation of Chalmer's Church will either modernize their present building or erect a new church.

SARNIA, ONT.—New plans are being prepared under which it is proposed to construct the St. Clair tunnel full size. After the plans are approved of by the directors of the G. T. Company, it is understood contracts will be let for the whole work.

STRATFORD, ONT.—$6000 has already been subscribed towards the erection of a new Baptist Church, the estimated cost of which will be $9000.—The Salvation Army propose building a barracks in the spring.—Mr. Jonathan Scarth will erect two two-story brick buildings in the spring.

ST. THOMAS, ONT.—Extensive repairs will be necessary to the city hall, which was last month badly damaged by fire.—The sum of $10,000 has been subscribed by a joint stock company for the erection of an opera house. Stockholders purpose advertising for a manager to assume the stock and contribute the additional sum necessary to erect a suitable building.—The contract for the erection of a new wing to Alma College has been let to J. M. Green at the sum of $14,618. Contract for steam heating is still open.

MONTREAL, QUE.—The congregation of Mellville Presbyterian Church contemplate enlarging their church to double its present size in the spring.—Y. M. C. A. have purchased site for a fine new building near Windsor hotel. Particulars may be had from the Secretary.—The Provincial Government intends to build a new wing to the Montreal courthouse at a cost of $175,000;—The Governors of the Royal Victoria hospital, Montreal, have instructed Mr. Saxon Snell, the well-known hospital architect of London, to prepare plans for the new hospital. He is expected to visit Montreal shortly in connection with the work.—The Liberal Conservative Association of this city will erect a building to cost $50,000.

TOKONTO, ONT.—Plans for the new Upper Canada College building have been completed by Architect Durand, of London, and tenders for the work will be called for. Building will be E-shaped, and will have a frontage of 250 feet, sides 200 feet.—Public School Board is considering the question of erecting a new school in St. Matthew's ward, and of enlarging the Jesse Ketchum school. —The Royal Canadian Academy of Arts has purchased a site on which to erect a public picture gallery.—Water Works Committee of City Council will spend $15,500 in completing workshop on Phoebe Street and additions to present offices of the department. —Architect E. J. Lennox reports: Spadina Ave. Methodist Church cost $65,000; add. to Bertram's hardware store, Yonge St., cost $4,500; two houses for W. R. Stewart, Wilcox St., cost $7,000; house and stable, Church St., for Dr. Graham, cost $5,500; three houses Carlton St., T. Gearing, cost $10,000; building at Berlin for the Economy Insurance Co., cost $10,000; residence Bloor St. West for L. Lukes, cost $9,000; residence Selby St., for A. G. Rundle, cost $7,000; factory on Pearl St. for J. Morrison, cost $10,000; Sunday School Bond St. Church, cost $17,000; add. to R. & T. Watson's factory, Front St. East, cost $6,000; three houses on St. Andrew's Square for J. Davis, cost $14,000; church alterations at Belleville, cost $5,000.

FIRE EXTINGUISHING EXPERIMENTS.

A SERIES of experiments of interest to fire underwriters, as well as to manufacturers of rubber goods, were lately made at the works of the Walworth Manufacturing Company in South Boston, the object primarily being to determine by actual test the behavior of the material known as rubber cement. This material is composed substantially of rubber dissolved in naphtha, and is indispensable in the manufacture of rubber goods. Both the naphtha and the cement have hitherto been dreaded by the fire insurance interest, and with good reason. It is well known that the pouring of water upon burning naphtha is worse than useless, since it not only fails to extinguish the flames, but serves to simply splash the burning oil about, thus scattering the flames; and the opinion is generally entertained that rubber cement behaves in a similar manner.

The object of the experiments above referred to, was to observe the behavior of these articles, while burning when treated to a stream of water, and particularly when subjected to the finely divided spray delivered from the so called "sprinklers," which of late have come into very general use in mills. The result of these trials demonstrated that rubber cement is by no means so hazardous as has been supposed, since it is shown that water, especially when delivered from an effective sprinkling apparatus, will quickly extinguish it. Naphtha alone, however, is shown to maintain its bad pre-eminence as a specially hazardous material.

We give below an account of these tests, with the results obtained, as recorded by the insurance editor of the Boston *Commercial Bulletin*. The tests were as follows:

First: A quantity of naphtha of 70° was placed in an iron pot and ignited. It continued to burn without being affected by the shower from the sprinkler.

Second: Boards representing flooring or wood-work, as benches, fixtures, etc., were wet with naphtha and ignited. By the time the naphtha had burned off the wood-work was afire.

Third: The above was repeated with fresh wood. The sprinkler was allowed to operate, and while it did not extinguish the flames, it prevented them from igniting the wood.

Fourth: A quantity of rubber cement, worked up with naphtha into the ordinary consistency, was ignited in an iron pot. The sprinkler promptly extinguished the flames. The wet cement was then immediately ignited from the touch of a match and again readily extinguished by the sprinkler. Cement placed on woodwork was ignited and extinguished just as it was in the pot. Relighted and again extinguished in the same way.

Fifth: Cement was placed on woodwork and ignited. No sprinkler was used, and the cement shortly communicated the flames to the woodwork.

Sixth: A lot of woodwork was saturated with naphtha and another lot was covered with cement. Both were ignited and the sprinkler allowed to work. The flames on the lot covered with cement were promptly extinguished, but the flames on the lot covered with naphtha continued unaffected by the water, and the naphtha exhausted itself. But neither lot of woodwork became ignited.

Seventh: A considerable quantity of cement still remaining, it was ignited in a tin dish, and the sprinkler promptly extinguished the flames. The receptacle was warped out of shape but not melted, and can be seen at Secretary Taft's office containing the cement which was ignited and extinguished.

THE experiments with the incandescent electric lights which have been made at the torpedo station at Newport have developed a novel use for these lamps, and one that is said to promise to be of great value in naval warfare. With lamps of about 100-candle power fastened on the ends of poles submerged in the sea to a depth of twenty feet the water is so illuminated that objects in it can be distinguished within a radius of 150 feet. There is little or no glare from the submerged light to betray the presence of the boat using the poles. It is believed that by this means a boat might countermine an enemy's field of submarine mines by cutting his cables or sweeping them to one side. It is probable that torpedo launches will be equipped with these lights.

INCANDESCENT LAMP GLOBES.—The common practice of surrounding incandescent lamps with open globes or globes of ground glass, leads to a loss in the one case of from forty to sixty per cent. of the light, and in the other of from twenty-five to thirty-five per cent. A simple method by which the character of the light can be softened without experiencing so great a loss of intensity has recently been proposed, and consists in covering the globe of the lamp with a film of ordinary collodion, which can, by adding successive films, be made of any desired thickness. The reduction of the light of the lamp does not, it is said, with this method exceed ten per cent., and the system possesses the further advantage that the film can at any time be removed by simple friction.—*Boston Journal of Commerce.*

STAINED GLASS AND CANADIAN ART.

BY S. JONES.

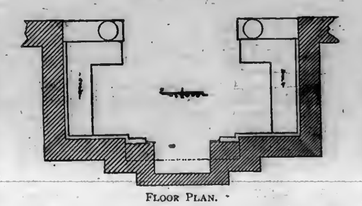
THERE is no intention in the following paper to give a historical or critical essay on the above subject, or to demonstrate the connection between its two branches; but it may be pertinent to say a few preliminary words on what constitutes art, Canadian or otherwise. It is scarcely necessary to point out to the readers of a journal of this character the illogical absurdity of the vulgar idea that all art is confined within the four sides of a picture frame, yet this false conception has been disastrously prevalent even down to the present Victorian era of English art. Many of the most eminent painters (not to trouble you with enumeration of great modelers and workers in brass, iron, stone, wood or the many forms of artistic reproduction) have been also designers, and have let their art run outside of picture frames. The draughtsmen for, and workers in, stained glass, for instance, now reckon among their number names that were, or could have been, eminent in any department of art. Nor is there need to press the claim of stained glass as a medium for the highest form of art workmanship. Since its discovery and application to all purposes of utility and beauty, its translucent and prismatic charms have won for it a recognition too general if anything, for the beauty of it is such, it seems almost to possess the faculty of dazzling the judgment as well as the visual organs, so that the same superstition has held since its latter revival, that *anything* must be good if it is stained glass This is an absurdity as inimical to true art as the picture frame theory. No fortunate jumble of pretty color in any material can be called art. Design is the foundation of all art, from a lady's brooch to a Cologne cathedral.

To appreciate the distinction between good and bad heraldic work, just compare an ordinary sign painter's treatment of any quadruped or bird, with its weak, unctuous roundness, shapeless masses of muscle, and saucer-eyed ferocity, its smoothly badgered shadows, deep-cast shades and reflected lights, and the vigorous drawing and flat decorative treatment of one of the pure Gothic school. It is the difference—even when the drawing is equal—between the grace and life of a greyhound and the bloated rotundity of my lady's overfed pug.

The renaissance of stained glass is scarcely half a century old, and from its revival to the present day, gigantic strides have been taken in the direction of beauty and consistency of design, architectural fitness, more natural and correct drawing, harmonious coloring, and, in church work, of devotional expression. Clayton, Heaton, Holliday, Grylls, Morris, Bayne, Kemp, Burn Jones, and a few others, are the root and life and the acknowledged masters of the movement that has since spread over the civilized world. Germany, Italy, Austria, and even France, the modern Greece—the cradle and home of art—acknowledged the supremacy of the English school. All that is good in Canada or the States springs from this one source. But though "there were giants in those days," I am not denying the fact that other decorative artists have arisen since who may be equal to some of those mentioned, Frederick Shields and Almquist, an Anglicized Swede, being among the number.

Turn we now from the old world to the new, and enquire, briefly, how stands the manufacture of stained glass in the United States and Canada? Has the young western giant who has advanced by leaps and bounds in science and literature—whose enterprise and vigour, boundless resources and commercial genius have seemed resistless—imbibed all the old world experience and improved upon it? Not so! The tourist, the traveller, who would seek for high-class native American art work in glass and interior decoration, would have to explore far and wide. With the exception of Mr. Lafarge, by far the greatest naturalized American artist, and some work by the Tiffany Company, in New York, he will find that all the good church work comes from London, Paris, Lyons, Berlin or Munich. Why, this is, exactly, I cannot say. Several explanations are feasible. The conditions have not been hitherto favorable. The large churches and cathedrals are only now being built. There has not been the demand for good work, the knowledge of what it consists of, the desire for it, or faith in native ability to produce it. The only certain thing about it is that, despite some recent assertions to the contrary, it has hitherto not been forthcoming. I trust I am doing no injustice to our American cousins. My knowledge of their work is very limited compared to my experience of English glass. Still, I would hesitate to make a charge like this on my own responsibility. I am not relying on personal observation. It is the consensus of opinion from reliable and independent sources, and I stand by the statement. I have the highest admiration for their achievements in many directions of art even. In many branches of lithography and engraving, for instance, they have distanced the world. I frankly admit they do some good domestic work with a beautiful material called opalescent glass. To those who are not familiar with this material, any written description of it would be clumsy. Less transparent than pure glass, it catches and holds the light better from its inequality of surface and latent opacity, changing its hues and reflecting radiances somewhat as the gem would from which it derives its name. I have seen some good specimens of color and design in this material, but in too many cases reliance is placed simply on the beauty of the product. Many intricate forms are

RECESS AND FIRE PLACE FOR HALLWAY.
BY GEO. G. BOOTH.



FLOOR PLAN.

obtained, requiring great skill in the cutting and leading of such difficult substance, but there is too feeble an attempt at any given style, at any consistent design, even to a scheme of color; and much of the work in this direction, paid a good price for and highly thought of, is simply (apart from the mechanical skill required to cut and lead it) destitute of all directing intelligence—a hetrogeneous mass of mindless magnificence. There is a rage just now for using the same material for church work in the States, which, till I see more of, I will say little about, except that it strikes my insular views as a move entirely in the wrong direction. Infinite pains and patient labor are required in selecting a piece of opalescent that will represent a well-drawn portion of drapery, for instance—painting nothing in a figure but the head, hands and feet, and leaving the whole of the remainder of a raw material—however beautiful, still raw, and too dazzlingly bright to conform to the atmosphere of a temple for worship. I have an old-fashioned prejudice in favor of the effect which Milton describes when he speaks of

"Storied windows, richly dight,
Casting a *dim* religious light."

Such effect could scarcely be produced with opalescent glass. The brightness and glitter that would cheer a home in a fan light or hall door, is not necessarily as appropriate to a religious edifice. But, of course, if our neighbors think different—well, it's a free country, but I prophesy they will soon educate themselves out of it.

The only window John Ruskin has been known to praise was one by Messrs. Burlison & Grylls, of London, where the key of color was very low—grey blues, dull olive greens, brown reds; the main tint in white and gold, but producing a sombre rich effect—depending on the form, the leading *motif*, the design, so that the window merges itself into its frame, the edifice itself, and does not glare out like a vulgar patch of gaudy trippery on a sober suited garment.

Let us now examine the state of taste, knowledge and proficiency, in glass work here at home. Canada, despite her many drawbacks, has steadily advanced: her log huts budding into villages, her villages into thriving towns, and her towns spreading into broad, fair cities. From "Muddy York" to the "Queen City of the West," Toronto—like the swift Atalanta—has so rapidly outrun all her fair compeers that it is not easy to realize in how short a space of time she has emerged from the chrysalis shell of her shanties of logs to the beauty of her many palatial residences that adorn her streets and suburbs—exchanging her crude plaster little Bethels for the magnificent churches for which she is famed. So brief is this space of time, it is difficult to determine the growth of art in its varied applications. Some of the early work in engraving, lithographic printing, carving or stained glass, for instance, would be deemed crude and unsatisfactory by the firms now engaged in their production. But with the constant connection, the ever renewed touch with all art centers—the steady influx of skilled craftsmen and designers from the same sources—Toronto is brought abreast with her old-world rivals in many respects. In the recent Colonial Exhibition, Canada surprised the world by her display of natural products, but even a greater surprise was reserved for her proficiency in many forms of art manufacture: her organs and pianos, carved cabinets, and stained glass.

It should be the pleasure, as it is the duty, of all Canadians who have the permanent prosperity of the country at heart to give a wise and generous patronage to all that is good in native workmanship. Too seldom are prophets honored in their own country. Whilst we unlock our boundless wealth of forest, lake and mine, why not cultivate the adorning graces too that shall soften and ennoble this rough-hewn structure? Get a School of Mines by all means, that should be the deeply-laid foundation of Canada's future greatness; but also aim at a School of Art that shall not be American, French, or even English, but Canadian. Establish a School of Design: they have done wonders in the old country, having wrenched the palm of superiority for many art products from France and Germany. Why may not Canadians do the same? They are of the same stock. Let us give our youths especially a more technical training and reform the system of apprenticeship. For the minerals the earth yields us, train a battalion of Tubal Cains to mould the metal, not for utility only, but to all forms of grace and loveliness. Be content with no second place, but aim at the highest. Step right out in the front and stay there, and if older civilizations dispute our claim let them put their powers to the proof in fair encounter. Something has been done already. Not Canada, not Ontario alone, but the city of Toronto has been heard of in all corners of the earth as a great musical center, thanks to the efforts of a few earnest artists, and in particular Mr. F. H. Torrington. We have native poets, on whom the "immortal nine" have looked benignly. Some portrait painters in Toronto are in the front rank, and do work that would grace any salon in Europe. We have architects, too, who could "erect dreams in marble and preach sermons in stones" with any European architects.

If Canada sink back into oblivion or remain but half civilized, the fault will lie entirely with the purchasing public, "the men of light and leading," who should show a better example. It is not that native work is inferior, that the most aesthetic taste cannot be satisfied at home, nor from any necessity or love of art that wealth is sent abroad, but simply at the dictate of fashion or the more contemptible behest of some mercantile motive. The best art manufacture can be had right here by those who can appreciate it, and are willing to pay a fair price for it. As Ruskin complained long since: "The fashionable rich know nothing of art and care less, but must nevertheless make-believe to have taste, and get the greatest conventional art effect for the smallest possible outlay." If this stigma once

applied to the older civilization, why must it to the new? Why not Canada throw off old world trammels altogether and set an example of true culture to both continents?

A handsome memorial window has just been put in position in St. Thomas' Church, Hamilton, by the relatives of the late Isaac Anderson. It consists of three panels representing the transfiguration of Christ.

Mr. Begy, the well-known painter and decorator, of St. Catharines, is adding a brick and plate glass front to his establishment on James St., and is converting the first upper floor into an artistic show room.

An ingenious veneering process consists in pressing a metallic pattern into the wood, this pattern being usually composed of zinc. After inlaying in the mould thus provided, the rest of surface is planed to the same level and then polished.

All effects in decorative art are studies in the relations of things. Any two things which belong to each other are related by a third that unites them—the essence of both. Unrelated things are always ugly—a load of furniture, for example.—*Edmund Russell.*

The bronze powders may be used by the home decorator for many purposes. Small plaster casts carefully bronzed—using a fine camel's-hair brush—make elegant little statuettes for stand or bracket ornaments, and larger casts treated in the same way will look nearly as well as real bronze statuary.

CARVER'S POLISH.—In a pint of spirits of wine, dissolve two ounces of seed-lac and two ounces of white resin. The principal use of this polish is for the carved parts of cabinet work, such as standards, pillars, claws, etc. It should be laid on warm, and if the work can also be warmed at the time, it will be still better. All moisture and dampness should be carefully excluded.

FRESCO PAINTING.—A microsopic examination of the ground on which fresco pigments are laid shows a film of crystals, due to the absorption of carbonic acid from the water with which it is damped, converting the surface of the hydrate into carbonic of lime. Hydrate of lime oozes out from beneath through this crystaline film and penetrates the pigments, which are held in place by capillary attraction, but the pigments must be applied before this exudation has proceeded too far.

A finer, cheaper and more durable moulding than plaster of Paris, and which becomes in time as hard as stone, is made as follows: Two pounds of best whitening, one pound of glue and half a pound of linseed oil are heated together and thoroughly incorporated by stirring. The compound is then laid on a stone, covered with whitening and reheated, and when of tough consistence is cut into pieces adapted to size of mould into which it is forced by a screw press. The ornaments or cornice may be fixed to frame or wall by means of white lead.

The high capacity for decoration of the open grate renders welcome its approval by sanitary authorities as securing good ventilation and favoring radiation, that pleasantest form of securing heat as against the alleged amount of heat lost, but with the announced progressive advance in the price of coals, the suggestion is opportune of supplying a screen beneath the grate, rendering it air tight, it being sufficient for consumption, that the air has access to the top of the fire. Not only is coal thus economized, but less heat escapes and gases are better consumed.

IVORY GLOSS ON WOOD.—There are two kinds of varnish used to produce this white gloss—one a solution of colorless resin in turpentine, the other in alcobol. For the first pure copal is taken; for the second sixteen parts of sandarac are dissolved in sufficient strong alcohol, to which are added three parts of camphor; and lastly, when all are dissolved by shaking; five parts of Venetian turpentine are added. In order to cause the the color to remain a pure white, care must be taken not to mix the oil with the white paint previously put on. Best French zinc paint mixed with turpentine is to be employed. When dry, this is rubbed down with sand paper, and this is followed with the application of the varnish above described.

Paper hangers' paste is best made by first heating the water to boilng, then adding flour, stirring constantly, to prevent the formation of lumps. The flour may be passed through a sieve, so as to insure it a more equal distribution. Agitation is continued until the heat has rendered the mass of the desired consistency, and a few moments further boiling it is ready for use. In order to increase its strength, powdered resin in proportion of one-sixth to one-fourth of the weight of the flour is added. To prevent its souring oil of cloves of a few drops of carbolic acid should be added.

KEEP PLUMBING FIXTURES CLEAN.

THERE are many housekeepers who imagine that first-class plumbing should not require any attention. How often have we seen plumbing fixtures of the best design and quality kept in the most filthy condition?—a condition so bad that inferior plumbing would cause less injury to health.

Where people are aware that the plumbing in their houses is of an inferior quality, they take every precaution to reduce the evil to the greatest possible extent by cleanliness; but when the plumbing is of the best quality, many seem to think that cleanliness is not required, and blame the plumbing for any sickness which may result from their carelessness in not keeping the fixtures clean.

The fact of the matter is that the better the plumbing, the greater the care to keep everything in perfect order. Where there is good work there is generally a large number of fixtures, and the more fixtures the greater the necessity of cleanliness. In houses where the best plumbing is done, servants must be to a large extent depended upon to keep everything in order; and where servants are not closely watched, the work they should do is only too often neglected. The habit which many servants have of storing anything and everything about the plumbing fixtures, should not be allowed. It should be insisted upon that all fixtures should be left perfectly open and clear, so that a free circulation of air should pass in and about them. Closets, sinks, etc., should be regularly cleaned and all copper lining kept bright. The wood-work surrounding all fixtures should be thoroughly washed at frequent intervals or otherwise kept perfectly clean. In short, we would urge the most perfect cleanliness of all the fixtures and surroundings in every part.

The servants' fixtures should receive the attention of the mistress, as servants are proverbially careless of their surroundings. It is not enough that the principal fixtures should be clean—all should be clean, even in the most out-of-the-way part of the house.

It often happens that because the plumbing is good, temporary and local smells are noticeable. With bad plumbing, there is always a close, heavy odor, to which people become accustomed, and the temporary odor is not noticeable. When plumbing is good, the careless or indifferent use of the apparatus may be noticeable because of the absence of the overpowering and ever-present odor usually about inferior work.

Another portion of the house that should receive close attention is the cellar. Nothing should be allowed to remain in it in a state of decay or filthiness. The cellar should be kept as scrupulously clean as any part of the house.

TORONTO MASTER PLUMBERS' ASSOCIATION.

THIS Association was started four years ago with only four members, and for some time struggled along with very little success. Not unfrequently in those early days of its history the President and Secretary were the only ones to respond to the call for a meeting. Nothing daunted however, the leading spirits in the movement kept right on, and eventually succeeded in getting into the organization all the leading plumbers of the city. The proposal to put into operation a Plumbing By-law, seemed to awaken some interest among the plumbers in the Association, which has since grown into an active, influential organization representing about forty establishments. The Association is represented at the Federated Trades Association by W. Burroughes, J. Ritchie, Joseph Wright and A. Fiddes.

At the annual meeting of the Association held on the 30th January, the following officers were appointed for the ensuing year: President, W. J. Burroughes; Vice-President, J. Sim; Secretary, W. T. Guy; Treasurer, J. Ritchie, Sr.; Guide, C. Weeks.

The following resolution was adopted: "That all master plumbers of this Association will in the future, after the passage of this notice, refuse to supply any materials or furnish any labor to complete a job of plumbing or work of any kind on which a master plumber of this Association has been previously engaged except by the full consent of the plumber who has before been employed. And such consent shall be given in writing only."

A resolution was all passed to the effect that in future no plumber will do work for a lump contractor, but will deal with the owner direct.

The Association has petitioned the City Council to amend the Plumbing By-law as follows:

That in rule 1, clause 10, the following words be inserted: "That the plumber shall be responsible only for such works as are actually performed by him. That after the word "time" in the fourth line of clause 9, be inserted "during the progress of the work;" and after the word "Inspector" in the last line of the same clause, "who shall on the satisfactory completion of the work, give to the plumber a certificate to the effect that the work has been inspected by a person appointed by the city, and found to fully comply with the requirements of the By-law, and that the certificate shall free the plumber from any further responsibility." That in clause 10, all words after "By-law" (2nd line) to "Toronto" (4th line) be struck out. That in clause 14, in place of the words "any credible witness," in the fourth line, be inserted the following: "the Plumbing Inspector, and in the event of any person being charged with infractions of this By-law, he may in his own defence produce one or more witnesses, such witnesses to be master plumbers in good standing in Toronto."

The Association is very desirous that the By-law, after being amended in the directions suggested above, should be permanently enforced.

THE RELATIONS OF TEMPERATURE TO HEALTH IN DWELLING HOUSES.

By D. BENJAMIN, M. D.

WHAT is generally called a "cold," is always produced by some change of temperature, with or without moisture, to which a part or the whole of the person has been exposed. In most cases the change must be from a given temperature to a lower one in order to produce a cold. One is more apt to take cold if a part and not the entire body be exposed to a low temperature. Dampness adds greatly to the power of a low temperature to produce a cold.

A cold is a disturbance of the circulation of the blood, whereby a part of the body has too little blood in it, and, therefore, some other part has too much. The part that has too much is said to be congested, and if the congestion is not promptly relieved by treatment inflammation is sure to follow. If in the throat, croup; in the lungs, pneumonia; in the bladder, cystitis, etc.

The human flesh is elastic and contractile, and, therefore, when cold is applied to a part it contracts, holding much less blood, consequently some other part must contain more than it should. Moreover, all vital action goes on more slowly in a low than in a high temperature, so that by cooling a part overmuch its nerve energy and vital force are greatly affected, causing delayed and dangerous reaction, or actual destruction of a part; while the undue blood in some other part of the body lights up inflammation that would not have been called into existence without this stimulus.

Cold applied to the skin generally produces congestion of the mucous membranes, because of their similarity of construction, nerve supply and continuity of structure to the skin.

The most healthful temperature for the human body to live in is about 70° Fah. In a slowly moving atmosphere at 70° Fah. a person cannot take cold; but a change of 10° Fah., especially if it is sudden, is often sufficient to cause one to take cold.

The foregoing are undeniable truths, based on physiology, chemistry and physics. Their importance, and the practical application of them, especially in the prevention and treatment of diseases of the respiratory organs, we will now consider.

A few years ago I began making some observations and experiments on the circulation and temperature of air in rooms, with results which appear to me to be of practical importance. The conditions of temperature and circulation of air vary greatly in rooms, especially those that are in use.

Fig. 1 gives the results of experiments in a room 10 feet high, 12 feet wide and 20 feet long, with a good stove and steady fire. Three-story brick house, south front, twelve rooms, and warm cellar. Out-door temperature, 24° Fah. By examination of Fig. 1, it will be seen that when the center of a room is 78°, four feet from the window it may be 70°; one foot from the window, 54°; and at the window 40° (no doors or windows having been opened for thirty minutes), a difference in the room of 38°.

In Fig. 2, a vertical section of the same room, it will be seen that while the head is 10 75° the feet may be in 50°. What must be the effect on a person who removes his warm boots and wears slippers, or the one that lies down to sleep on such a floor? Many do these things, however.

Fig. 3, shows an every-day occurrence among thousands, yes, millions of people. A child three or four years old, from playing near a stove or on a nurse's lap, in a temperature of 70° or 80°, perhaps in a sweat, goes to a window and stands, without any change of clothing or protection, for half an hour or more, in a temperature anywhere from 30° to 55°. How such a

thing can occur without resulting in croup or pneumonia must be marvellous to any one who studies the subject even casually.

In many instances there is a small crack or opening

either under the sash or at the side, and almost always at the junction of the upper and lower sash, where a stream of air is passing into the room nearly as cold as the outside air, though it be below zero. Cold air at a high speed striking a child directly on the bare throat

or breast can seldom fail to produce some dreadful disease.

On a very cold day, in some of the wooden houses inhabited by poor people with many children and little time to look after them, children may often be found sitting on the floor in a temperature of 38°, or standing with nose against a window pane at 20°, when the mother is washing or ironing in 65°. These people generally have but one fire in the house, and that in a cook-stove, which cannot heat the floor at all, while cold drafts come from every other room, and especially from the stairway. In churches and theaters the galleries will be 85° to 90° when the floor is 70°; then the opening of a door or window is very injurious, and going out into the air at 10° or 20° also causes a dangerous strain on the system.

In view of the principle already given, it seems to me that this is a striking state of affairs, and perhaps no principles of hygiene are so grossly violated as these. No wonder that the death list in Philadelphia alone in a single year reaches the dreadful sum of 1,000 from pneumonia, and about 400 from croup (preventible diseases in most cases). It is also somewhat remarkable that the subject has not before been written up in medical works. The thermometry of hygiene and the sick room is a fruitful field for cultivation.

By reference to the cuts, it may be seen that it is easy to be exposed in five seconds to a change of 40°, a circumstance that can never occur out of doors. In open air the temperature is nearly the same from head to foot, and changes much more slowly than in the house. A child gets off the bed and sits on the floor—a change of 10°, it may be 20°; or it goes to the window, possibly to scratch in the beautiful frost-work on the glass—a change sometimes of 40°. This explains why people take cold more frequently in the house than they do out of doors. In fact, I do not believe that people will take cold by habitually going out if they exercise and are properly clothed.

THE TORONTO PLUMBING BY-LAW.

THE By-Law passed by the Toronto City Council for the regulating of plumbers who desire to carry on business within the city, and which has now been in successful operation for the period of one year, reads as follows:

(1). Upon and immediately after the passage of this By-law, in every ensuing year, there shall be taken out by every person desiring to carry on business or trade as a Plumber within the limits of the City of Toronto, a license, for which license the person, or persons in the case of a partnership firm, shall pay at the time of taking out such license the sum of one dollar; and no person shall receive such license who shall not have attained the age of twenty-one years and have a place of business within the City of Toronto, and who shall not furnish the City Engineer and the Medical Health Officer of the City of Toronto with satisfactory evidence of his responsibility and skill to ply his trade in accordance with the terms and conditions, rules and regulations contained in this By-law and in any other By-laws in force from time to time in the City of Toronto respecting plumbing, drainage, sanitary matters, and the Toronto Water Works; and no license shall be granted to any Plumber except upon the certificate of approval of the City Engineer and Medical Health Officer, save as hereunder provided.

(2). Every person desiring such license shall file with the General Inspector of Licenses a petition in writing, giving the name of the firm, if he shall be one of a firm, and each member thereof, together with the place of business, asking to become a licensed Plumber, and said petition shall be accompanied by a bond signed by two or more sureties to be approved of by the Chairman of the Local Board of Health, conditioned in the sum of one thousand dollars, that he or they will conform to all the conditions and requirements of the said Corporation and of the Bylaws of the said City for his government or in default thereof will submit to such penalties as are or may be prescribed, by the Council for the government of Plumbers.

(3). Any change of the firm or location of the business must be promptly reported to the General Inspector of Licenses, and the license shall be kept in a conspicuous place at the place of business.

(4). When two or more persons are co-partners, licenses shall be issued in the name of the firm or co-partnership, and no license shall be transferable.

(5). Any Plumber, or firm of Plumbers, who shall be guilty of violation of any of the provisions of this By-law shall forfeit his license and shall be subject to the penalty of the By-law, hereinafter set forth.

(6). All licensed Plumbers shall be held responsible for all acts of their agents or employees done by virtue of their said license. No license shall be granted for a greater period than one year or the unexpired portion thereof. All licenses shall expire on the last day of December of each year, unless sooner revoked.

(7) The following Rules and Regulations shall be observed in the construction of the drains, soil pipes and plumbing of all houses and buildings within the limits of the City of Toronto:

RULE 1.—It shall not be lawful to construct or extend any drain for the reception of sewage or waste water under or into any hotel, tenement house or dwelling house, or to connect the same with any public or other sewer, drain or cesspool, unless the said drain shall in its plan and construction conform to the following requirements: First—All the drains and plumbing fixtures of every house or other buildings shall be provided with sufficient traps and vents to prevent gas from the sewer drain or waste pipes from escaping into any apartment, and each such fixture shall have its own trap with sufficient vent. *(b.)* The outlets of above mentioned soil pipe and inlet pipe shall be so situated that from neither of them shall gas be liable to pass into any window, chimney or other opening into any other house or other habitation. *(c.)* No refrigerator waste shall be allowed to connect with any drain. Second—Between the said trap and the foot of the soil pipe there shall be connected with the main house drain, at or near the point where it leaves the house, an inlet pipe for the admission of fresh air, and the soil pipe within the building shall be continued above the roof, and left open so that the whole of the inside drainage may be thoroughly and constantly ventilated.

RULE 2.—Before proceeding to construct any portion of the drainage system of a hotel, tenement, warehouse, dwelling house or other building, the owner, or his agent, constructing the same shall file in the office of the City Engineer a plan thereof, showing the whole drainage system from its connection with the common sewer or cesspool to its terminus in the building, together with the specification and sizes of all branches, taps, ventilating pipes and fixtures.

RULE 3.—All plans must be legibly drawn in ink on heavy white paper or on tracing linen.

RULE 4.—The size of the paper or linen must be 12½ inches by 15 inches, and the drawing so made as to leave not less than one inch margin outside thereof.

RULE 5.—One vertical drawing will be sufficient for a building when it can be made to show all the work. If the work is intricate and cannot be shown by one drawing, two or more must be furnished.

RULE 6.—One plan will be sufficient to show the work of any number of houses, if built alike at one time and situate together. Upon the plan the street numbers of the houses of which the said plan represents the plumbing arrangements must be marked.

RULE 7.—Every plan must be accompanied by a clear description thereof, or abstract of the specifications in a blank form, prescribed and supplied for this purpose showing size, kind and weight of pipes, and kind of traps, closets and fixtures to be used.

No lead pipes shall weigh less than the following:

FOR WATER WORKS.

⅜	inch internal diameter,	4	lbs.	per lineal	yard.
½	" "	6	"	"	
⅝	" "	8	"	"	
¾	" "	10	"	"	
1	" "	13	"	"	

LEAD WASTE OR VENT PIPES.

1	inch diameter,	6	lbs.	per yard.	
1¼	"	7	"		
1½	"	8	"		
2	"	10½	"		
2½	"	13½	"		
3	"	16½	"		
4	"	24	"		

No iron pipe shall weigh less than the following;

IRON PIPES, WEIGHT PER LENGTH OF 5 FEET.

6	inch diameter,	100	lbs.
5	"	85	"
4	"	45	"
3	"	30	"
2	"	20	"

RULE 9.—A duplicate on tracing linen of each plan as approved must be furnished for the use of the Inspectors before the first inspection. Tracing paper will not be accepted.

RULE 10.—Plans and specifications shall be approved of or rejected within ten days from the time of filing.

RULE 11.—If, upon inspection of said plan, the City Engineer, Medical Health Officer, or other official or officials appointed by the Council for the purpose, shall find that the same does not conform with the rules and requirements laid down or to be laid down by him or them in respect to plumbing and drainage, either by this or any other By-law, or with the By-laws of the said City of Toronto, he or they shall not issue any permit for the construction of such building or its drainage, and it shall be unlawful to construct such building and the drains connected therewith or connect the same with any sewer. All regulations and By-laws referred to in this rule shall be printed by the Department, and a copy supplied to any ratepayer applying for the same.

RULE 12.—The City Engineer must be notified when any work is ready for inspection, and all work must be left uncovered and convenient for examination until inspected and approved of. The inspection shall be made within three days after the notification shall have been given to the City Engineer who shall apply either the ether, peppermint, water or smoke test, and record the result of such inspection in his office.

RULE 13.—After a plan has once been approved, no

alteration of the same will be allowed except on a written application of the owner, or of the agent of the owner, to the City Engineer.

(8). (*a*) Each house or building must have its own separate soil pipe and drain, and such soil pipe or drain shall be so placed as to be always readily inspected without excavation or destruction to walls or floors, and the Plumber shall be responsible for the proper connection of his work with the system of drainage, which connection shall be made by a cast iron bend and three feet of pipe from the vertical soil pipe; and no two or more houses or buildings shall have drain in common until each separate drain shall have passed outside the walls of the house or building which it serves. (*b*). No pan closets shall be fitted up or used in any building, and no closet or other convenience which allows the escape into the house of air or gas which has been confined in any part of it, or from the drain or soil pipe, or which allows the accumulation of filth in or about it shall be fitted or used. (*c*). Every connection between lead and iron pipes shall be made with brass thimbles or ferrules having properly wiped joints, and the ferrules shall be properly gasketted, leaded and caulked into the said pipe. Ferrules for four inch pipes shall weigh not less than 2½ lbs., for three inch pipes not less than 1¾ lbs., and for two inch pipes not less than 1¼ lbs., each ferrule not to be less than four inches in length. (*d*). All water supplies within a house or building must be graded down to a stop and waste cock, which is to be placed just inside the outer wall of the building or cellar. (*e*). The Inspector must be satisfied that all water pipes are laid with due regard to freedom from danger of freezing, and every service pipe must be provided with a stop and waste cock for each consumer, easily accessible, placed so as not to be endangered by frost and so situated that the water can be conveniently shut off and drained from the pipes.

(9). All work done by licensed plumbers shall be subject to the inspection, supervision and approval of the City Engineer, Medical Health Officer, or Inspector appointed by the Corporation of the City of Toronto for that purpose, and all faulty or defective work which may at any time be discovered shall be made satisfactory to the said City Engineer, Medical Health Officer or Inspector, as the case may be.

(10.) Any plumber whose license shall be declared forfeited by the City Engineer for a violation of any provisions of this or any other By-law relating to drainage, plumbing, sanitary matters, or the Toronto Water Works and the supply of water to the City of Toronto, shall not again be entitled to a license until the said declaration of forfeiture shall be revoked by the City Engineer.

(11). The City Engineer, Medical Health Officer, or any Inspector appointed for that purpose, shall have the right, and they are and each and every of them is hereby authorized and empowered to enter upon and into any premises at all reasonable hours, and from time to time, as the occasion may require, for the purpose of enforcing compliance with the provisions of this or any other By-law, Rule or Regulation which may at any time be in force in the City of Toronto respecting the Toronto Water Works, licensing and regulating plumbers and plumbing, sanitary and drainage matters.

(12). The Council of the Corporation of the City of Toronto shall from time to time, as occasion may require, on the nomination of the Local Board of Health, appoint such and so many Inspectors of Plumbing as may be found necessary, but no person shall be eligible to such appointment who shall not have passed a satisfactory examination for proficiency in both the practice and theory of plumbing and draining, before a Board of Examiners consisting of the said City Engineer, Medical Health Officer, two practical master plumbers in good standing in Toronto, to be chosen by the Master Plumbers' Association, and an architect or sanitary engineer, to be chosen by the Sanitary Association of Toronto, to hold office for one year.

(13). Any candidate for a plumber's license shall be examined before and by the Board of Examiners named in the preceding section of this By-law, and their certificate, or the certificate of a majority of them, shall determine the right of the candidate to a license.

(14). That any person or persons guilty of an infraction of any of the provisions of this By-law shall, upon conviction before the Mayor, Police Magistrate, or any Justice or Justices of the Peace for the City of Toronto, on the oath or affirmation of any credible witness, forfeit and pay, at the discretion of the said Mayor, Police Magistrate, Justice or Justices convicting, a penalty not exceeding the sum of fifty dollars for each offence, together with the costs of prosecution; and in default of payment thereof forthwith, it shall and may be lawful for the Mayor, Police Magistrate, or Justice convicting as aforesaid, to issue a warrant under his hand and seal; or in case the said Mayor, Police Magistrate, Justice or Justices, or any two or more of them, are acting together therein, then under the hand and seal of one of them to levy the said penalty and costs, or costs only, by distress and sale of the offender's or offenders' goods and chattels; and in case of no sufficient distress to satisfy the said penalty and costs, it shall and may be lawful for the Mayor, Police Magistrate, Justice or Justices convicting as aforesaid, to commit the offender or offenders to the Common Jail of the said City of Toronto, with or without hard labor, for any period not exceeding six calendar months, unless the said penalty and costs be sooner paid.

INTERESTING EXPERIMENTS WITH TYPHOID GERMS.

THE village of Iron Mountain, Michigan, was last summer ravaged by typhoid fever, epidemic in its nature. It was suspected that impure drinking water was the cause of the trouble, and to settle this point a sample of the water was sent to Dr. Vaughn, of the School of Hygiene, at the State University, for an analysis. The epidemic was so severe that 350 cases were reported, first and last, and 35 deaths. One part of the town has a public water supply and escaped the scourge, but the other part, whose inhabitants are supplied with water from shallow wells of from 6 to 20 feet in depth, was sorely visited by the disease. The examinations of Dr. Vaughn led to the conclusive discovery of germs in the water capable of producing typhoid fever. The doctor inoculated sterilized meat preparations and sterilized milk with the well water, and kept the preparation at the temperature of the body for seven days. During this time the germ developed in both the meat and the milk.

He then resorted to a further experiment, which is said to be the first of its kind, and which may prove to be of the greatest possible interest and value. Taking some of these typhoid germs, the doctor inoculated several cats with them, and in each case a disease similar to typhoid fever was developed, thus apparently establishing the certainty of the source of the epidemic and also the possibility of using the lower animals to trace such a disease back to its cause. In a report covering these interesting facts, just made to the State Board of Health, Dr. Vaughn says that there are annually in Michigan 1,000 deaths and 10,000 cases of sickness from typhoid fever, adding his conviction that nearly all this may be prevented if the people will only stop polluting the soil and the water. He adds some other important practical conclusions. A succession of freezing and thawing may ultimately result in the destruction of the typhoid germs in the water, but it matters not how cold the winter may be if there is not a continued succession of freezing and thawing the typhoid germ will not be affected. The same is true with regard to ice formed on impure water. The poisonous germs will be preserved intact to do their deadly work the moment the ice is brought into use. As in so many cases typhoid fever arises from the use of impure water and impurely diluted milk, the doctor recommends, where any doubt exists as to the purity of the water, that it should always be boiled.

The Port Arthur Water and Light Company has recently been incorporated.

The city authorities of Winnipeg propose to extend the city sewers and provide for the proper flushing of them.

The Board of Health of Quebec province report that during the year 1887 not a single case of small-pox appeared in the province.

Stratford is discussing the electric light. A proposition has been made to buy a Royal plant at a cost of $10,000, to run fifty lamps.

Cholera has broken out in some of the South American ports. Our quarantine officials will doubtless keep a careful look-out in that direction.

A committee appointed by the Ontario Provincial Board of Health has reported that the recent fever epidemic at Ottawa was caused by the use of river water of inferior quality.

The Goderich local papers are calling on the town authorities to take measures for preventing the spread of infectious diseases, in view of the prevalence of diphtheria in the town lately.

It will be remembered that last year Sir Donald Smith and Sir George Stephen gave half a million dollars apiece towards the erection of a public hospital in Montreal. The city thereupon gave a site for the building at the foot of the mountain, above the reservoir. The Local Board of Health has decided to ask the Council to get the opinion of a scientific commission as to whether the city water supply would be likely to be affected by the nearness of the hospital.

The Drain Inspector of Montreal says that housekeepers should not think so hardly of draughty, cool houses in winter. He believes that many people are saved from sickness in badly drained houses owing to unpremeditated ventilation. "Often and often," said Mr. Lowe, "the house we would consider the warmest, best and nicest fixed is the one where sickness stays longest owing to the imperfect drainage. There is nothing like ventilation. Housekeepers, too, do not pay sufficient attention to the sinks. Closed sinks get especially dirty, and prove little hotbeds of disease."

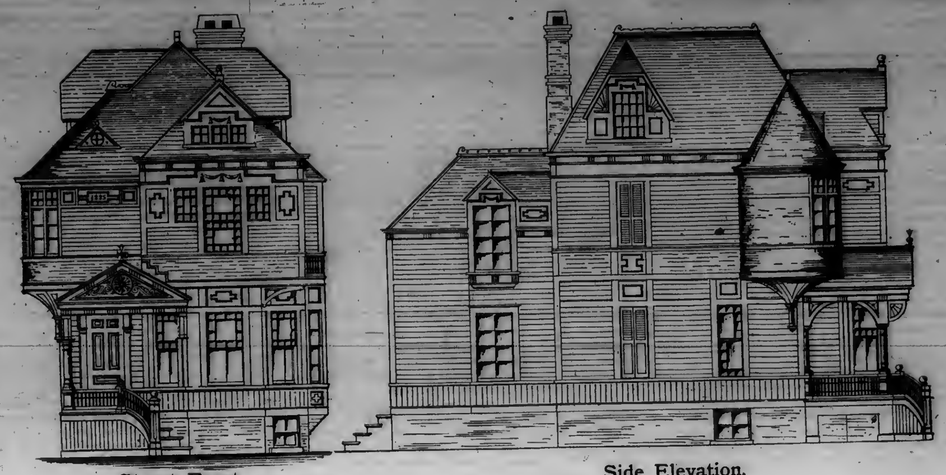
A system of steam heating for railway cars is said to be in successful operation on the Canada Atlantic Railway. It is known as the Sewall system, and consists of a main pipe with radiators in the cars. Heating is supplied by the engine; and provision is also made for supplying heat, independent of the engine, in case of a car being side tracked or waiting at junctions for incoming trains, or in event of accident interrupting the connection with the main supply of steam. In such cases heating steam is supplied from a small boiler in each car, that receives the drip of condensed water from the pipes, having a small fire box under it.

The proceedings of the second annual meeting of the Association of Executive Health Officers of Ontario, just closed in this city, were of a most interesting and profitable character. The programme included reports of committees on "House and Land Drainage and Disposal of Sewage"; "Ventilation of Houses, Schools and Public Halls"; "Food, its Adulteration and Unwholesome Supply"; Milk Supply, its Sources and Contamination"; "Water Supplies and their Contamination"; "Removal of Night Soil and Garbage"; "Control and Prevention of Disease"; "Dangerous and Unhealthy Occupations"; "Sanitary Legislation." Instructive and valuable papers were read on "Methods of Dealing with City Sewage," by P. Drayton, Chairman Local Board of Health, Toronto; "Recent Methods in Milk Analysis," by N. B. Nesbitt, B.A. M.D., Toronto; "The Duty of the State in Investigating the Causes of Disease," by Prof. Victor C. Vaughan, of the Laboratory of Hygiene, Ann Arbor, Mich; "Methods of Biological Analysis of Drinking Water," by Prof. Ramsay Wright, M.A., University College, Toronto; "Compensation of Health Officers," by Francis Rae, M.D., Chairman Provincial Board of Health; "Cremation of Town Refuse," by Prof. W. Oldright, M.A. M.D., University Medical Faculty, Toronto; "Condition of Factories in Ontario," by J. R. Brown, Inspector under the Factories Act. We may have more to say regarding the work done at this convention in our March number.

WHAT CONSTITUTES JUDICIOUS ADVERTISING?

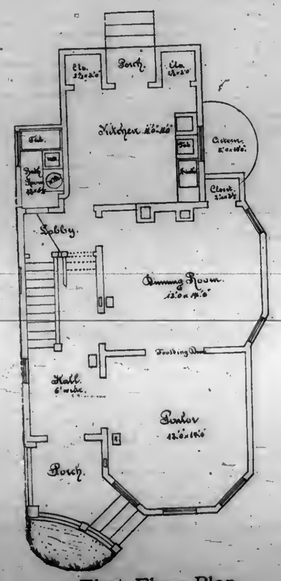
AS to the advantages of judicious advertising, most business men are agreed; but judging from the vast amount of money wasted annually by advertisers, the methods of judicious advertising are but very imperfectly understood. The following extract from an article in the *Toronto Saturday Night*, on "Advertising as a Fine Art," is in accord with common sense, as well as the experience of successful advertisers. Our contemporary says:

"Promiscuous advertising is most injudicious. A man who wants to express goods to a certain town will not ship them over half-a-dozen roundabout roads. He will send them by the most direct route, get them to his patrons quicker and save himself annoyance and expense. It is practically the same in advertising, although the oily-tongued advertising agents who flood the country and earn a precarious living by assurance and gab, would endeavor to convince the advertiser that all roads lead to Rome. It is a mistake to suppose that advertising in a paper with a large circulation is necessarily judicious advertising. No greater error could be made. I spoke a while back of the wholesale grocer and his advertisement in the widely-circulated daily as compared with the same advertisement in a trade paper. The same illustration answers here. The trade paper may not have the circulation of the daily, but IT GETS TO THE PEOPLE THE ADVERTISER WANTS TO REACH, which is all he wants, while he saves the percentage of money he would have to spend to put his advertisement before those readers of the daily not affected by it, and who are consequently of no use to him. If he desires to reach a thousand people in a certain walk in life, it is cheaper for him to utilize the columns of a paper that goes to those thousand people and no others, than it is to pay five or six times more for the use of a paper which only reaches about half the people he is anxious to appeal to, although its outside circulation may amount to forty thousand."

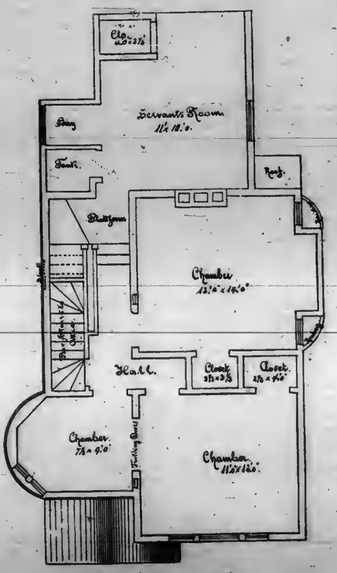


Street Front. Side Elevation.

DESIGN FOR COTTAGE COSTING $3,000.



First Floor Plan.



Second Floor Plan.

MANUFACTURING MATERIALS.

Shellac and borax boiled in water produces a good stain for floors.

The Peterboro' Bridge Works have been removed to larger premises.

The Beaverton Brick and Tile Co. have dissolved partnership. Mr. Taylor will in future conduct the business.

A company formed in this city recently will establish large works near the mouth of the Niagara River for the manufacture of heating furnaces, etc.

A test of the new pumping machinery for the Water Works Department of Hamilton, showed the pumping capacity of the engines to be in excess of the requirements.

The beautiful enamelled bricks frequently used for outside or interior decoration are made by applying to the surface a colored flux, which during the burning causes the silex to melt and cause a vitreous covering.

Mr. R. Davis, ship builder, has closed a contract with a fire proof cement works company of Montreal to freight 2,000 tons of soapstone from Portland Bay, Rideau Lake, to Montreal during the coming summer.

Operations have been going on briskly at the Forks of the Credit, notwithstanding the severity of the weather. Messrs. Scott & Pattullo, Armstrong & Sharp and Britnell & Co., are each giving employment to twelve men.

The bulk of the stone used in the construction of the new International Bridge at Sault Ste. Marie was quarried at Owen Sound, Ont. Mr. R. M. Paterson, the inspector of masonry, says the quality of this stone is unsurpassed on this continent.

A colossal stick of lumber from Puget Sound has been contributed to the Mechanics' Exhibition at San Francisco. Its length is 151 feet, and it is 20 x 20 inches through. It is believed to be the longest piece of timber ever turned out of any saw mill.

At a meeting of the St. Thomas Plate Glass Association held a few days ago, the following directors were appointed:—J. J. Mickleborough, A. M. Hutchinson, Dr. McLarty, Alex. Lindsay and Dr. Luton. Dr. McLarty was elected President and J. P. Martyn, Secretary-Treasurer.

The Hungerford Marble Quarry Co., Madoc, Ont., are receiving every encouragement as the result of their recent explorations. It has been demonstrated, as the opening of the vein continues, that the marble is there in paying quantities and of a very good quality. Mr. Whitney, the manager, expects to have the product of these quarries in the market during the coming summer. The industry promises to return handsome profits and employ a large number of men.

A new invention designed to take the place of stained glass is white paper manufactured from cotton or linen and modified by chemical action. The paper is dipped into a preparation of alcohol and camphor, which makes it like parchment. From this point it can be molded and cut into remarkably tough sheets, entirely translucent, and can be dyed with almost the whole outline colors, the result being a translucent sheet showing, it is said, far more vivid hues than the best glass exhibits.

Rocks composed of chlorite are found in various parts of the world, and are used for ornamental constructions, especially for making smaller objects which can be turned with a lathe. These are the stones which are called by the French *pierres ollaires*. A chlorite from Potton, in Lower Canada, has been used. It is found in beds of the Lower Silurian age, lying immediately upon the Laurentian rocks; it is associated with dolomite or serpentine, and, like the latter rock, it contains some chrome iron.

TEST FOR GLUE.—The following simple and easy test for glue is given: A weighed piece of glue (say one-third of an ounce) is suspended in water for 24 hours, the temperature of which is not above 50° Fah. The coloring material sinks, and the glue swells from the absorption of the water. The glue is then taken out and weighed; the greater the increase in weight the better the glue. If it then be dried perfectly and weighed again, the weight of the coloring matter can be calculated from the difference between this and the original weight.

We learn from the London *Free Press* that arrangements are in progress with a firm in that city for the construction of a machine, patented by Mr. Israel Kinney, of Windsor, for the manufacture of patent fire-proof lathing. The machine weighs between eight and ten tons, and will take six or seven months to build. It is intended to construct the machine and operate it in London. Mr. Kinney also states that the machine will turn out cresting, grating, screens and bridgework. He has a patent for the invention both in the United States and Canada.

IRON BRICKS.—Louis Jochim, of Ottweiler, near Saarbruecken, Germany, is introducing paving blocks, which he calls iron brick. They are made by mixing equal parts of finely ground red argillaceous slate and finely ground clay, and adding 5 per cent. of iron ore. This mixture is moistened with a solution of 25 per cent. sulphate of iron, to which fine iron ore is added until it shows a consistency of 38° Baume. It is then formed in a press, dried, dipped once more in a nearly concentrated solution of sulphate of iron and finely ground iron ore, and is baked in an oven for 48 hours in an oxidizing flame, and 24 hours in a reducing flame. The German Government testing-laboratory for building materials has reported favorably on this brick.

HOW TO PREPARE CALCIMINE.—Soak one pound of white glue over night; then dissolve it in boiling water, and add twenty pounds of Paris white, diluting with water until the mixture is of the consistency of rich milk. To this any tint can be given that is desired. *Lilac.*—Add to the calcimine two parts of Prussian blue and one of vermilion, stirring thoroughly, and taking care to avoid too high a color. *Gray.*—Raw umber, with a trifling amount of lampblack. *Rose.*—Three parts of vermilion and one of red lead, added in very small quantities until a delicate shade is produced. *Lavender.*—Mix a light blue and tint it slightly with vermilion. *Straw.*—Chrome yellow, with a touch of Spanish brown. *Buff.*—Two parts spruce, or Indian yellow, and one part burnt sienna.

A Russian professor has been experimenting on the best way to remove dry rot. He says that a thorough draught will destroy the parasite within twenty-four hours. If the action of draught be assisted by that of sunlight, a few hours will often suffice to put a stop to further damage. A concentrated solution of common salt is very efficacious; and the stronger it is used the more rapid its action. The action of a concentrated solution of cupric sulphate (blue stone, blue vitriol) is still more energetic and complete than that of common salt. Crude carbolic acid is rapid in its action and cheap, but inconvenient to use. But he considers that the best, cheapest, and most convenient material to employ is the tar obtained when birch wood is distilled for acetic acid; the under surfaces of the flooring are painted with the tar.

IMPROVED BRICKS.—For obtaining products that will offer greater resistance to humidity, etc., than ordinarily is the case, an improved process of manufacturing bricks has been brought forward in Germany. After drying and grinding the clay, a mixture is made of 91½ parts of the latter, 3 parts of iron filings, 2 of table salt, 1½ of potash, and 2 of elder or willow wood ashes. The whole is heated to temperature varying from 3,362° to 3,632° Fah. At the end of from four to five hours the argillaceous mixture is run into molds, then re-baked in the ovens—always protected from the air—at a temperature of 842° to 932° Fah. The product may be variously colored by adding to the above quantity two parts of maganese for a violet brown, one part of maganese for a violet, one part of copper ashes for a green, one part of arsenite of cobalt for a blue, two parts of antimony for yellow, and one and a half parts of arsenic and one part of oxide of tin for white.

In the new system of electric bells invented in England and now being introduced, says the Boston *Journal of Commerce*, the magnet box is dispensed with and the hemispherical bell is replaced by one of the church type, inside of which is the electro magnet, the latter being a single solenoidal magnet of special construction, and by it the armature is attracted by both poles simultaneously. By this means less than half the usual quantity of wire is required, thus reducing the external resistance of the circuit one-half. Moreover the armature, besides being magnetized by induction, as acted on in the ordinary method, is directly polarized by being in actual magnetic contact by the connection of the gimbal—which is in one piece with the armature—with the core iron of the magnet, and it is thus induced to perform the largest amount of work with the smallest electro motive force. Again, instead of the armature and clapper being in a straight line attached to a rigid spring, which necessitates a considerable attractive power to primarily give it momentum, this new system has the armature and hammer in the form of an inverted U, and being perfectly balanced from the point of suspension, the lines of force from a comparatively small magnetic field suffice to send this improved form of armature into instant regular vibration. By using a flexible break-and-make arrangement, a better result is attained.

TESTS OF WOOD FOR BUILDING.—J. B. Johnson, director of the U. S. Testing Labratory, at Washington University, says: Manufacturers, builders, architects and too many engineers rely solely on the tables and formulæ given in the trade or engineering handbooks. They know nothing of the original experiments from which the tables are derived, and too often are unable even to verify the truth of the formulæ. As a matter of fact, the portions of these books referring to the strength of materials, and especially of wood, were based on experiments on small specimens and were made about 100 years ago! Some of the arguments in favor of a new test are given below. All the old tests were made in England, and, as already remarked, on small specimens. The Western American woods *have never been fairly tested* for strength. Such tests as have been made on large specimens of American wood have shown the strength to be only about one-half what all the tables give them. Many cheaper kinds of timber may prove more valuable for structures than more expensive varieties, which have been supposed to be stronger. Thus pine supports or pillars have been found stronger than oak ones, when tested in full-sized samples. Notches cut in beams or joists, whether at the ends or in the middle, have been found to weaken the pieces a great deal more than is generally supposed. When a joist is notched into a floor beam or header, it is only about one-half or one-fourth as strong as when left full size and resting on the bottom. It always splits from the notch. If the portion below the notch be sloped off so as to be the full depth at the middle, the strength is doubled. That is to say, by removing a portion of the joist (in case of a notch), the strength is increased. This seems paradoxical, but it is true in practice and consistent with theory. It then does not fail by splitting from the end, but by breaking apart in the middle. The shearing or splitting strength of timber is of great importance in structures and is almost always overestimated. A few well-arranged tests will give more information to the designer than all the tables in the handbooks on these matters.

BUILDING MATERIALS.

Foundation: (*Wholesale Prices.*)

Dimension		
Block		
Rubble		
Bluestone: (℘ sq. ft.)		
Sidewalk	30@5 00	
Planed	50	6 00
Sandstone:		
Longmeadow		80
Kibbe		90
Brown, Connecticut	1 00	
Amherst, Ohio	90	95
Berea, Ohio	75	1 00
Berlin, Ohio	75	1 00
Belleville	80	1 25
New Brunswick and Nova Scotia		1 00
Caen		
Marble: (℘ cu. ft.)		
Lee, Mass.		
Rutland, white and blue		
Sutherland Falls	1 25	1 73
Glen's Falls, black		
Italian, blue-veined		
" sienna		
Tennessee, red		
" Knoxville		
Pennsylvania, blue		
Vermont, white		
Slate: Roofing (℘ square).		
" green	5 00	6 00
" " unfading	5 00	6 00
" purple	3 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me.	3 50	8 00
" black slate		7 50
Tiles, American, ℘ M.		
N. Peach Bottom, warranted unfading		

PAINTS. (*In oil, ℘ lb.*)

White lead, Can	6	6 50
" zinc, Can	6½	8 50
Red lead, Eng	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" Indian, Eng.	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (℘ Imp. gal.)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3¾
Whiting, dry	75	1 00
Paris white, Eng., dry	1 25	1 50
Litharge, Am., "	6½	8
Sienna, burnt	15	20
Umber, "	8	12

BRICK.—℘ M.

Canadian, common (half and half)		8 00
" face		10 00
" hard (sewer)		8 00
" pressed		18 00
" moulded		30 00
Common: *Cargo afloat.*		
Pale		
Jersey	6 00	7 00
Long Island	7 50	8 00
Up River		
Haverstraw Bay, 2nd		7 50
" 1st		8 00
Hollow		13 00
Fronts:		
Croton, brown	10 00	14 00
" dark	11 00	15 00
" red	11 00	15 00
Chicago pressed		
" moulded		
Baltimore	37 00	41 00
Glen's Falls, white	30 00	35 00
Philadelphia	27 00	28 00
Trenton	25 00	26 00
Milwaukee		
Moulded:		
Clark's Glens Falls, red	25 00	27 00
" " white	30 00	35 00
White " mold	45 00	60 00
Fire Brick, Ramsey T. Carr & Bute	25 00	28 00
Enamelled: *Imp.*		
Enamelled (edge)	85 00	100 00
Enamelled (edge and end)	90 00	115 00

CEMENT, LIME, etc.

Portland Cement		
Walsend, per bbl.,		2 75
Francis & Son, "Vectis," "		2 75
Johnson's "		3 00
White's Cement, "		2 75
Queenston Canadian Cement, "		1 50
Grey Lime, per 2 bush. barrel, bulk		35
White " " " "		55
Hair, per 40 lb. sack		1 00
Plaster Paris, N. B., per bbl.		2 13

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$34 00@35 00	
1¼ and thicker, three uppers, Am. ins		40 00
1¼ and thicker, pickings, Am. ins		30 00
1 x 12 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
1 x 10 and 12 dressing	14 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
1 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1½ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	15 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		14 00
1½ inch flooring	14 00	13 00
XXX shingles, sawn	$2 40@2 50	
XX shingles, sawn	1 30	1 50
Lath, sawn		1 80

YARD QUOTATIONS.

Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		10 00
Shipping cull boards, promiscuous widths, stocks		13 00
Scantling and joist, up to 16 ft.		13 00
" " 18 ft.		14 00
" " 20 ft.		15 00
" " 22 ft.		16 00
" " 24 ft.		17 00
" " 26 ft.		18 00
" " 28 ft.		19 00
" " 30 ft.		20 00
" " 32 ft.		21 00
" " 34 ft.	22 50	22 50
" " 36 ft.		24 00
" " 38 ft.		27 00
" " 40 to 44 ft.		30 00
Cutting up planks, 1½ and thicker, dry	25 00	26 00
" " board,	18 00	20 00
Dressing stocks	14 00	15 00
Picks, American inspection		30 00
Three uppers, American inspection		40 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 1 x 14, per M		11 00
B. M.		
1¼ inch flooring, dressed	25 00	30 00
1½ " rough	14 00	15 00
1¼ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		[illegible]
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

ST. JOHN, N. B.

Iron, etc.		
Refined, ℘ 100 lb or ordinary size	2 25	0 00
Common, 100lb	2 10	0 00
Patent metals, ℘ lb	0 00	0 11
Anchors, ℘ lb	0 00	0 00
Chain cables, ℘ lb	0 03	0 06
Rigging chains, ℘ lb	0 03	0 3½
Lime.		
Casks	1 10	1 15
Lumber.		
Spruce deals, Bay Fundy Mills	8 00	8 25
Spruce deals, City Mills	8 50	9 50
Aristook P. B., Nos. 1 and 2	40 00	45 00
No. 3	30 00	35 00
No. 4	15 00	20 00
Aristook P. B. shipping	15 00	16 00
Common	12 00	13 00
Spruce boards	7 00	8 00
Spruce scantling (unst'd)	7 00	8 00
Spruce, dimensions	11 00	14 00
Pine clapboards, extra	35 00	40 00
No. 1	0 00	30 00
No. 2	0 00	20 00
No. 3	11 00	12 00
Laths, spruce	1 25	1 35
Laths, pine	5 50	8 00
Palings, spruce	5 50	8 00
Nails.		
Cut, 3dy, ℘ 100lb	3 75	0 40
Cut, other sizes	2 74	3 50
Ship Spikes	3 70	5 02
Galvanized	5 25	6 50

VOL. I.] The Canadian Architect and Builder. [No. 11.

MEDICAL COUNCIL BUILDING, TORONTO.

E. J. LENNOX, ARCHITECT.

HEAD OFFICE NEW YORK LIFE INSURANCE CO., MONTREAL.

Babb, Cook & Willard, Architects, New York.

PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No. III. TORONTO, CANADA, MARCH, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—

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C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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ADVERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisemeots not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippiogs or written items of interest from their respective localities.

WE are indebted to the Department of Education, of Ontario, for the illustrations in this number of school house designs and methods of ventilating schools. They were originally published by the Department for the guidance of school trustees, in a book entitled "School Architecture and Hygiene."

WE print elsewhere in this paper an article from *Building*, exposiog the operations of some of the Building Plan Associations which profess to supply builders and persons intending to build with all information necessary to enable them to become their own architect. In view of the fact that some of these associations have already commenced operations in Canada, it was our intention to sound a note of warning to those who might otherwise be led to invest their hard cash in a lot of skillfully sketched designs, the actual cost of which, perhaps, bears no proportion to the estimates accompanying them. As our New York contemporary in the article referred to has done the work so thoroughly, we shall content ourselves with simply calling the attention of our readers to the remarks cantained therein.

WE notice that there is a movement to have the use of glazed sewer pipe done away with in the construction of the medium-sized sewers of Toronto, and to substitute brick. We understand that the object of this movement is to give more work to bricklayers. While this may be a very praiseworthy thing to do, yet, if the cost of these sewers should be greater, it would not be in the interest of the community to make the change. There is, however, a more important side to the question. A brick sewer, no matter how carefully built, cannot compare on sanitary grounds with a well laid glazed pipe sewer. It is impossible to build a brick sewer that will not retain more or less deleterious matter upon its surface. The glazed surface of a sewer pipe does not retain such matter to any extent. It is absolutely necessary that we should have the most perfect sewer that it is possible to build, even though the cost should be considerable over the inferior article, and we hope that the interests of no class or section of the community will be considered, but that the general good will be served without fear or favor.

IN Enrope and the United States, the value of artistic knowledge as applied to industrial and other pursuits of life, is forcing itself upon the attention of thoughtful minds, and the demand is being made for a larger amount of instruction in drawing and kindred subjects to the children in the public schools. In Canada the various art schools are doing a good work, but there is need that greater attention should be given to the subject of art by those who have in hand the training of the young in our public schools. To this the answer may be made that already the children are burdened with too many subjects for study, and therefore should not be saddled with more. Undoubtedly the number of subjects is too large, and, it might be added, needlessly so. Several of the subjects named might, with very little if any loss to the pupils, be set aside altogether, which would allow time for more comprehensive and thorough instruction in the principles of art—instruction the fruit of which would be seen in after years in the skill of our artisans and the appreciation of our people for the beautiful and the true.

OUR thanks are due Toronto architects, builders, plumbers, decorators, etc., for the assistance they have so kindly given us in our efforts to provide matter of practical interest to our readers. To friends in Montreal, Hamilton, London and Winnipeg, we are under like obligations. It is our desire that this journal should be a record of construction work throughout the entire Dominion, and not for the city of Toronto or Province of Ontario only. To make it such, it is necessary that persons interested should send to this office from time to time such information as may be obtainable in the locality where they reside. The possession of this information will make this journal cosmopolitan instead of local in its character, and enable the editor to discuss intelligently matters affecting the interest of localities in the more remote provinces, as well as those near at hand. While on this subject, we may state that arrangements have been made whereby in future issues we shall supply builders with illustrations of details of construction which must prove of very great interest and value.

WE take pleasure in being able to present to our readers this month a synopsis of an address on the subject of "Carpentry and Joinery" delivered before the Architectural Draughtsmen's Association of this city by Mr. Wm. Simpson, the able Secretary of the Master Carpenters' Association of Toronto. It is our purpose to present in future issues of this journal a synopsis of the series of practical talks now being delivered to the members of the above Association by gentlemen belonging to the different branches of the building trades. Just here we take the liberty to remark that architectural students and others in any way interested in architecture and building, in this city, should make it a point to attend the meetings of the Association, as by doing so they may gain a large amount of information which will prove most valuable in helping them to solve the problems connected with their every-day duties. Those residing outside of Toronto who are unable to avail themselves of the privileges of the Association, will find much to interest and instruct them in the reports published eachmonth in these pages.

THE erection of the Toronto Court House proceeds, if at all, very slowly. Another year will pass without any actual work being done on the building. This in itself would not be a serious matter if anything was being done which would tend toward the erection of a suitable and complete building. The old condition of administrative incapacity of the past year still continues. There bas been no intelligent attempt to put the matter in a sensible or satisfactory position. It is possible that the building will eventually be built, but when, or how, or by what means, it would at the present time be very hard to even guess. Of one thing we may be certain, without a great change comes over the Building Committee, that it will not be through any energetic or comprehensive action on its part that this much to be hoped for object will be secured. It is now about four years since competitive plans were advertised for, and nearly two years since the excavation was commenced, and yet we are not even ready to stake out the building. Still we have some hope that we shall see the walls ready for the first floor joists, or even for the roof, before we die.

THERE should be some municipal control over the erection of fences on the street line. There are many fences in this city which are dangerous to those using the sidewalks. A low iron fence, adorned with spikes every few inches along the top, is exceedingly dangerous when the sidewalk alongside the fence is covered with ice. Imagine what would be the result to a person who, walking alongside such a fence, should slip and fall upon it. That such a fall would result most seriously no one will deny. Some may say that the possibility of such an accident is not very great as no one has been hurt by falling on a fence. Such an answer will not do, as it is only right that every precaution should be taken to prevent accidents, and not wait until some one is seriously injured by what could have been easily prevented by ordinary foresight. Several persons have narrowly escaped falling upon low fences ornamented with dangerous spikes. If we must have fences on our street line, they should, if furnished with an array of spikes, be high enough not to allow of any one falling on the spikes, and if they are low, the top line of such fences should be such that very little injury would be received by any one falling upon them.

DOUBLE the number of building permits have been granted by the City Commissioner thus far this year than during the same period in 1887. This fact points to a season of unusual activity in the building line during the approaching season. It is a significant fact, however, that while the architects are busily at work preparing plans for new structures, they have instructions from their clients in many cases not to call for tenders or place contracts until such time as the rate of wages for the different trades has been agreed upon. Persons intending to build want to know what their buildings are likely to cost, and they also want the assurance that when the work of construction has been commenced, it will not be stopped or delayed on account of strikes on the part of workmen. It is a matter of regret that the

daily papers, by reporting the opinions of every Tom, Dick and Harry who assumes to represent the views of the workmen, are assisting to arouse feelings of discontent, the result of which may prove disastrous to all concerned. Bearing in mind the great distress to workmen, and the loss to the entire community which resulted from the protracted strike of last summer, it should be the aim of every one to do all that is possible to prevent a repetition of such conflicts. The present position of affairs may be fairly stated thus: A large amount of building is contemplated, and will be undertaken if the feeling of uncertainty regarding workmen's wages is at once removed. The probability of strikes would have the effect of delaying or stopping entirely a great deal of this work. Therefore, every workman and every employer who desires prosperity for himself and for the community, should seek to have all matters of possible dispute definitely and permanently settled without further delay.

IT is to be hoped that some action will be taken to show how much or how little there is in Mr. Davies' scheme for the relief of the esplanade. Now is the time to give the scheme the careful consideration it deserves. The C. P. R. are about to erect a station building, and if erected to serve trains running on the present levels it could not be altered except at a very large outlay. The whole question of the esplanade is practically up at the present time for settlement. Whether the city will be cut off from the bay for all time to come, has now to be determined. If the railways are allowed to make further outlays on their present tracks, and to erect buildings to serve the present grades, it will be exceedingly difficult and much more expensive to make the change in the future. That the erection of an elevated track system will be of incalculable benefit to the city, if the bay front is to be taken advantage of, will readily be admitted. If the frontage on the bay is to become the home of manufactories, there is very little to be gained in doing away with the present dangerous "level crossings." But if we are to have a drive along the bay front in connection with the park system, and close and convenient points for the departure and arrival of the island ferries, nothing should prevent the doing away with the present dangerous system of level tracks, except our inability to carry out the work.

Very little care has been taken in the past to study out what may be the future requirements of the city, and to make intelligent provision to secure all the advantages possible. There is little doubt but that this city will increase very much in size and enormously in wealth in the next few years. What may now seem a heavy burden will then be but a light one, and we must not forget that the increased value of the property south of the present tracks will go a very long way towards paying for the erection of the iron work necessary to carry all through traffic above the esplanade.

It has been suggested to lower the tracks to a depth sufficient to allow of the free use of the esplanade by bridges at the street crossings. This does not seem a reasonable proposal. The present tracks are but little above high water line, and it will be impossible to place them any lower at the most than high water mark, except at an enormous cost. It must be rememberd that the tracks ascend on the east and west to much higher ground, and that consequently to sink the tracks will increase the grade, but to raise them will make the grades much easier than they now are. The fact that Front street is so much higher than the esplanade, gives every opportunity for the arranging of proper station accommodation.

There can be but one opinion, and that is, that the placing of all tracks used for through traffic on trestlework would be a most decided advantage from every point of view. That it may be too expensive, is another matter, but until it has received full consideration, and the cost has been carefully estimated, it should not be assumed that the construction of the necessary trestlework would be beyond our means. It is absolutely necessary that this matter should receive the most careful consideration of our aldermen. The city has suffered long enough and sufficiently from the shortsighted, careless and indifferent policy of the past. Let us not give our descendants just cause to charge us with similar indifference to their welfare.

The accommodation furnished by the union station is very inferior, and by no means sufficient for the wants of the travelling public. That some very material enlargement of this station must be made very shortly is admitted, if any attention is to be given to the comfort of travellers. The through and local passenger traffic has grown immensely in the last few years, and must continue to increase. It is the intention of the C. P. R. to build a station between York and Yonge streets, on the south side of the esplanade. As everything which the C. P. R. does is well done, this new station will be fully equal to the merits of this city and of the C. P. R. traffic. But, if this station is built only to accommodate the traffic of the C. P. R., the city will have two stations, with all the accompanying inconvenience to the travelling public. The convenience of the railways should not alone be considered in the erection of station buildings. The public are very much interested in being supplied with the most convenient and ample station accommodation. One station is much more convenient than two or more. It does away with the trouble of transferring of baggage and the inconvenience of going from one station to another. It would be a great benefit to Toronto if the C. P. R. and G. T. R. would unite and build a grand union station, into and from which all trains would arrive and leave. One large and commodious building could be built much cheaper than two. The salary account would also be much smaller for the large station than for the two small ones, and the travelling public would have the benefit of ample and commodious station buildings arranged with the utmost attention to their wants. This great station could be erected south of the esplanade between Yonge and York street, and if the tracks on the esplanade were elevated for the through traffic, the general floor of the station could be on a level with the viaduct system. Passengers could gain access to the station by passing under the track system at all times and without danger. As it is, at present it is impossible to gain access to the union station without crossing tracks over which trains are continually passing. This will likewise be true of the proposed C. P. R. station. A more inconvenient and dangerous arrangement it would not be possible to conceive, especially when the traffic will have increased to much greater proportions. It is time that by the erection of over-head bridges access could be gained to both these stations, but not in nearly so serviceable or convenient a manner as by the former method. That commodious stations can be erected with the train platform above the ground level has been successfully demonstrated. The ticket and baggage offices can be arranged on ground floor, and the waiting room on the platform level. Passenger and baggage elevators will give ready means of communication between the two floors. A large portion of the space on the ground floor could be advantageously given up to the use of carriages and cabs, and the public would have the benefit of being able to get out of and into cabs under cover, fully protected from the weather.

We are pleased to notice that since the above was written the Mayor, in a message to the Council, strongly urges the carrying out of the scheme which we advocate, and a committee of the Council has been appointed to co-operate with committees from the Board of Trade and other corporations interested with that object.

PERSONAL.

Phillips & Mottashed, builders, Hamilton Ont., have dissolved. Jas. Phillips continues.

It is said that Mr. Thos. Raphael, contractor, will be the Conservative candidate in Russell.

John Keefer, a plumber, was badly scalded by the bursting of a steam pipe at the Industrial Home, St. Catharines.

Alfred Hastings died at his mother's residence, 304 Parliament street, Toronto, on the 14th of Feb. He was an estimable young man, and had served an apprenticeship with architect Mallory, of this city.

Zeotique Perrault, contractor, Montreal, has failed. Liabilities $11,000.

Mr. C. M. Chardon, builder, Vancouver, B. C., has been visiting in Lindsay, Ont.

Architect Gordon, of the firm of Gordon & Helliwell, this city, has just returned from a three months trip to Europe.

A well-known Montreal architect, Mr. Victor Bourgeau, died in that city a fortnight ago, aged 78 years.

F. J. Leigh, superintendent of the Canadian Locomotive Works, Kingston, has been elected an associate member of the Institute of Civil Engineers, England.

Mr. A. H. Gregg, architectural student, of this city, has obtained a position in the office of a firm of leading architects in Boston, and has gone to take up his residence in that city.

Architect Roberts, of this city, has just returned from a trip to Chicago and other Western points.

The painter's union at London has decided to make $1.75 the standard rate of wages per day of nine hours, after the 16th day of April next, that the hours of work shall be from 7 a.m. till 5 p.m., and that all overtime be charged time and a half.

PRIZES FOR COMPETITIVE DESIGNS.

THE editor of the CANADIAN ARCHITECT AND BUILDER has decided to offer the following premiums to the best designs sent to him not later than the 20th of April next. The subject of the competition is a town house, to cost not more than $2,500. The house is to be placed on the north-west corner of two intersecting streets. The size of rooms and their number will be left to the decision of the competitors. In deciding the competition, the location and size of rooms for their several purposes will be taken into consideration. A good plan with a poor elevation will receive higher marks than a good elevation with a poor plan. Each competitor will be allowed to choose the material of which his design is to be constructed. Competitors will be required to give a short and concise description of their design, and state the material they propose to use.

The editor of this paper reserves to himself the right to publish any design sent in. All designs to be sent to the office of this paper, No. 31 King street west, Toronto, postage paid. All designs will be returned to their author within a reasonable time after the competition is decided.

The first premium will be $10; second, $5; third, fourth and fifth, one year's subscription to the CANADIAN ARCHITECT AND BUILDER. The best perspective sent in will be entitled to a premium of $5, and the second, third and fourth to one year's subscription.

The decision as to the respective merit of the different designs submitted will be made by a committee appointed by the Architectural Guild of Toronto. The designs must be made with pen in black and white to allow of publication. No color will be allowed on any drawing, not even tinting the rooms on the plan.

If the designs submitted are not in the opinion of the examining committee of sufficient merit to deserve the premium offered no award will be made.

All architects practising in cities are debarred from this competition.

THE TORONTO FIRE BY-LAW.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—It is about time that we had a revision of the fire by-laws in Toronto. As at present constituted they militate against picturesque designs, while affording little real protection against the spread of a conflagration. Under the cloak of re-construction, the most flimsy devices are allowed to pass, as witness a building within a stone's throw of Lombard street fire hall. If any architect wishes to construct, on a detached residence, an overhung gable of frame covered with tiles, making a practically fire-proof wall, he is told by the Commissioner that he cannot do it unless he backs it up with good brickwork—frequently an impracticability. But by giving this same wall a slope of 3 or 4 inches, and calling it a mansard, he can build it in as flimsy a manner as possible, providing it be covered with tin, slate, or shingles in mortar.

Another restriction which curbs variety in design, is the refusal of the Commissioner to permit the construction of oriel windows which project beyond the street line on upper stories. Such projections are permitted in all the large cities in the United States, and there is no reason why they should not be permitted here under proper restrictions. Of course, in the business portion of the city, the framing of such projections should be constructed entirely of metal. Very good effects can be obtained on copper, which does not require painting, and improves in appearance with age, taking on a "bloom," which often gives exquisite effects in color.

The following from the Chicago *Bulletin* hits the nail on the head: "The idea of protecting the city from another general conflagration by the passage of the fire limits law was a good one, and worthy of commendation. In the central portion of large cities frame improvements should be prohibited; that is all right, not only because of their depreciating the value of business property, but their increasing the danger of fire. But some judgment must also be exercised in the enforcement of this particular kind of ordinance, and while public safety should be well guarded, the rights of citizens in other respects must be taken into consideration. The fire limits law as now enforced, out on the

bare prairie, miles away from improvements, is becoming a bug-bear, a farce and a nuisance."

ARCHITECT.

OUR ILLUSTRATIONS.

RESIDENCE OF J. A. HENDRY, ESQ., KINGSTON ONT.

We illustrate this month one of the finest residences in the "Limestone City," that of J. A. Hendry, Esq., situated on the corner of King and West streets, opposite the park. The building is constructed of red pressed bricks pointed in marble dust, and trimmed with sand stone and terra cotta. It is finished throughout in hard wood, and is heated and ventilated with direct and indirect hot water system. Messrs. Power & Son, Kingston, are the architects.

DESIGN FOR OVERMANTEL.

We present this month a sketch of a wood mantel in old English oak or mahogany, designed and executed by Messrs. William H. Bell & Co., 56 Pearl street, Toronto. This design is of the modern renaissance style, and produces a very handsome effect. The above sketch is very elaborately carved in the renaissance order, but can be produced in a less expensive manner by using the same lines and moderating the carved details. The mantel, as shown, is 8 ft. 6 in. in height, the shelf being 5 ft. 6 in. in length. There are twenty-five 5x5 in. bevel mirrors in the overmantel, the centre large mirror being 42x18 in.

HOUSE ON PEMBROKE STREET, TORONTO, FOR W. J. DAVIS, ESQ.

The contract price of the above house was $4,800. It is built of brick with slate roof, and front gable tile hung. The entire house is finished internally in stained and varnished pine. The basement extends beneath the whole house, and contains laundry, store and furnace rooms. All drains inside of house are of "extra heavy" cast iron, and the plumbing is of the best. The ground floor contains parlor, dining room, reception hall, pantries and kitchen. The first floor has three bed rooms, a cosy study, bath room and linen closet, and the attic, three bed rooms, childrens' play room, and a store room. Messrs. Langley & Burke, of this city, were the architects.

DESIGN FOR TOWN CHURCH.

THE POUGHKEEPSIE BRIDGE—DETAILS OF CONSTRUCTION.

SCHOOL HOUSE DESIGNS.

DESIGN FOR COUNTRY CHURCH.

THE ARCHITECTURAL GUILD OF TORONTO.

THE last monthly meeting of the Architectural Guild of Toronto took place on Thursday evening, March 8th. There was a good attendance and much interest taken in the proceedings. An animated discussion took place on the proposed reduction in size of brick by the Brickmakers' Association. The general feeling was against a reduction in size, especially in the length and width of the brick. The arguments of the brickmakers for a reduction were stated to the meeting, viz.: That the small bricks would dry quicker in the hacks and that fire would strike through much sooner than in the large brick, and that consequently a harder and better article could be furnished. As all the members were desirous of having a hard brick, they determined on recommending a reduction in the thickness to 2¼ inches, which would make a brick which would dry rapidly in the hacks and burn hard with much less fire. The size finally agreed upon was 8¾ in. x 4¼ in. x 2¼ in. The committee which had met the brickmakers' and the contractors' representatives on Wednesday, were re-appointed to meet them on Friday at 3 o'clock. At that meeting it was finally agreed that the size of brick should be 8¾ x 4⅛ x 2⅜, which is very nearly the size agreed on by the architects.

The members of the Guild agreed to specify not less than 80% of all brick used in their work to be hard brick, with the liberty to specify 100% when they so desired. This will result in much better building than we have been having, and of more uniform quality. The brickmakers have also agreed to furnish brick hereafter at the rate of 80% hard when no special arrangement is made as to quality. The discussion on this question shows conclusively that there are many matters relating to building in this city which can only be properly handled by the different architects meeting occasionally as they have been doing recently and working intelligently with all the different interests concerned.

The next meeting of the Guild will take place on Thursday evening, April 12th, when the usual dinner will be partaken of and an adjournment made to the Public Library, when an inspection of the many architectural works therein contained will be made. Mr. Bain, the Librarian, with his customary kindness and desire to do all he can to forward the interest of our citizens and make the many advantages of the Public Library known, has offered to do all in his power to make the evening both a profitable and an agreeable one to the members of the Architectural Guild. That it will be an evening to be long remembered by the members we have no doubt, and that many of them will be astonished at the number and the variety of the works on architecture and kindred branches, we have no hesitation in affirming. Without doubt there will be a very full attendance of the members at this meeting.

The financial condition of the Guild is exceedingly good, nearly all the fees having been paid in, and the large balance over and above the necessary amount required for running expenses placed at interest to form a "nest egg" for some future effort which will result to the great benefit of the architects as a body, and to the advancement of this branch of art in this country.

COMPETITIONS.

BY "CRITIC."

THE object of an architectural competition is to obtain the best possible design for a proposed building. That all competition is successful in this object will not be affirmed by anyone who has had any experience of competitions. There have been many competitions which have been very successful, but there have been many more which have been failures. Does the success or failure lie with those who arrange the competition, or with those who enter? We believe that the success or failure of a competition can in nearly all cases be laid to the manner in which the terms of the competition have been prepared. If the terms have been prepared with the idea that the building committee must protect themselves from the competitors as though they were a lot of most unprincipled men, it is no wonder that

NEW Y. M. C. A. BUILDING, DETROIT.

competitions fail. But if they are prepared by those who believe that the interests of the building committee and of the competitors are one, they will be almost always a success. The object of the building committee is to secure the best plan, and the object of the competitors is to have the best plan erected. Their interests are identical, and it will be found that the building committee which recognize this first, secure what they desire, viz., a good design in more than the majority of cases.

To influence good men to enter a competition the terms must be liberal, the work worth having, and the certainty of fair and honest treatment assured. No man who has an assured position, and plenty of work, is going to throw away a part of his time in a competition, any more than a sound, intelligent business man will buy lottery tickets, or deal in bucket shop speculations.

The decision should always be made by competent experts, and not by the members of a building committee, who are no more able to judge of the merits of a good plan than an architect is capable of judging of the quality of groceries or dry goods from the merchant's standpoint. Many designs have been selected because the members of a committee took a fancy to some feature that may in itself have been good or bad, but which should not have been allowed to decide such an important matter. The first place in a competition was once given to a design because the competitors showed a semicircular end to the library, the object of which was to allow of all book shelves being arranged on the radial lines, and thus allow the librarian to sit on the central point and be able to keep his eye on all the books. What he wanted to sit on a stool for and watch the books, no one could ever find out, but it struck this inexperienced building committee very favorably, and they immediately decided on this plan. That this room could never be extended, and that it was in point of fact the worst possible arrangement for a library, did not count with them. The arrangement seemed to them "just perfectly lovely," and they fell victims to their ignorance, and likewise the competitors who had really sent in the best design. Is it any wonder that men who have professional training refuse to have the merits of their work decided by those who very often have but little knowledge of the profession or line of business by which they themselves gain their subsistence? The terms of no competition can be so bad that there will be no competitors. There are always a number of inferior men to enter any competition, and occasionally one or two who have, or think they have the thing fixed, and that it is a sure thing for them.

It is necessary to a successful competition that the terms be simple and explicit—that there shall not be any attempt to protect one party to the gain of the other. Sufficient time should be allowed for studying out the requirements, and for careful designing. A full and complete statement should be made of the requirements, together with a general explanation of the purposes for which the building is to be erected. All points definitely determined on should be stated, but they should be as few as possible, so that the designer may not be unnecessarily hampered in trying to overcome what may turn out to be only a whim on the part of some one who did not fully understand the difficulties of the question. No information should be furnished any competitor, no matter how unimportant it may seem, without supplying it to all. It is not wise to limit the cost of the building to a hard and fast amount which will very likely prove to be inadequate. If it is definitely stated that any design which will cost more than the amount named in the terms will be thrown out, thrown out it should be, or else the competitors are not fairly or honestly treated. Where terms are made, they should be most strictly adhered to, no matter what the consequences are. Therefore it is advisable to estimate as carefully as possible what the expenditure should be, and also the amount which it is advisable to expend, and state that such amount is what the building committee desire not to exceed. It should be distinctly understood that this amount will not be exceeded if a good and suitable design can be obtained which can be erected for that amount; however, if there is no such design, that the best and most suitable one which least exceeds the amount named will be adopted. This plan will allow of each competitor judging for himself whether it is wise for him to design an inferior building within the money limit, or a good building which will exceed that amount in its construction. No injury is done anyone, for each is allow to judge for himself what to do in the matter. But when an amount is named, and it is distinctly affirmed that no design which will exceed that amount in its erection will be adopted, and one is adopted which will cost a much greater amount, it is exceedingly unfair to the competitors who have attempted to keep within the amount specified. If a sum is mentioned, and the desire is expressed that the design is to be kept within that amount, but that a good design will be built, even if it should cost more, rather than an inferior one at the stated amount, it allows a choice of the best and most suitable design. Of course it must not be supposed that the cost is not to be considered in the decision as to the merits of the respective designs. For instance, it would not be just to adopt a design which is but little better than another, but which will cost much more to erect. There is no doubt but that the hard and fast money limits have been the source of more trouble in competitions than almost anything else. The plan which has been outlined should to a large extent overcome this ground of trouble and complaint.

Another most troublesome point is the question of deciding as to which design sent in is the best. There is no doubt but that these questions should be decided by the highest professional talent, and not left to the whim or caprice of ignorance and conceit. The expert should be a man of the highest attainments in the profession of architecture, and of unblemished reputation for honesty. It has always been understood that when a man accepts the position of an expert he forever forfeits the right to carry out the work. This unwritten law has been established that an expert may act squarely to all competitors. Otherwise a man might report against all competitors and secure for himself the much coveted commission. That such has been done it is not necessary to affirm, as anyone who has any knowledge of how competitions have been conducted is fully aware of the facts. It may be safely affirmed that there are not many men following the profession of architecture with a reputation for good work, who would accept a commission to carry out a work where there had been a

competition, and had filled the position of expert. He would be perfectly aware that his honesty and honorable dealing would be looked upon as questionable, no matter how honorable or honest his intentions may have been

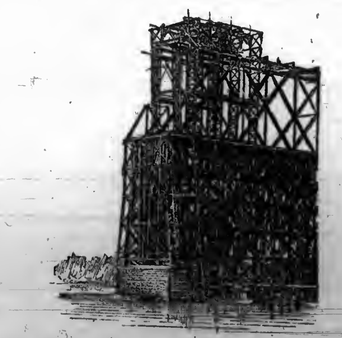
To secure the success of a competition a building committee should make the terms such as would induce themselves to enter the competition if they were architects. It is always possible to have competitors, but it is not always possible to get good men to compete. If there is any object in a competition, it is certainly to obtain the best possible design, and how that is to be obtained through a competition of second and third-rate men, we cannot understand. There is a mode of holding a competition which has resulted very satisfactorily in many cases, and that is to choose several good men to send in competitive designs, paying a stated amount to each, and allowing other designs to be submitted without any remuneration to the competitors. In this style of competition, the decision by a capable expert is just as necessary as in any other form. No man will risk his reputation, except where he believes that he will only be placed second to another because that is his proper position. There is nothing more galling to a man than to know that he has submitted the best design, and yet another has received the prize because of the incapacity and ignorance of the deciding authority.

At the regular meeting of the Architectural Draughtsmen's Association to be held on Tuesday evening the 20th inst., Mr. R. J. Hovenden will offer some remarks on the subject of "Painting." At the succeeding meeting on the 27th inst., the subject of "Sketching in Design" will be considered.

"Constans Fides" writes: I would advise students of architecture to study the following works: "William Chambers' Civil Architecture," 2 vols., by Joseph Gwilt; "Thomas Rickman's Gothic Architecture of England," 1 vol.; "Ferguson's Illustrated Hand Book of Architecture," 3 vols.; "Donaldson's Specifications and Law of Contracts," 2 vols.; R. J. Hatfield's "Transverse Strains," 1 vol.; "Encyclopedia of Architecture," 2 vols.; "Practical Mason," 1 vol.; "Brown's Domestic Architecture," 1 vol.

Basswood may be enormously compressed, after which it may be steamed and expanded to its original volume. Advantage has been taken of this principle in the manufacture of certain kinds of moldings. The portions of the wood to be left in relief are first compressed or pushed down by suitable dies below the general level of the board, then the board is planed down to a level surface, and afterward steamed. The compressed portions of the board are expanded by the steam so that they stand out in relief.

The Laborers' Convention, consisting of representatives from Thorold, Merritton and St. Catharines, and the Builders' Laborer' Union, has adopted the following scale of wages:—Builders' laborers, 17½ cents per hour, nine hours to constitute a days work, pick and shovel men, 15 cents per hour; corporation laborers, $1.25 for a nine-hour day.



CONSTRUCTION

THE BRIDGE AT POUGHKEEPSIE.

NO river in America is crossed by so many persons and so many tons of freight as the Hudson, and all pass by some means of water carriage if the passage is made below Albany. A glance at the map shows that from the coal and iron fields to the mills and shops of New England, for the greater part, a straight line will cross the Hudson far below Albany, and as a consequence all rail communication between these points requires a long detour. A straight line from Boston to Pittsburg traverses Massachusetts and Connecticut and the coal and iron fields of Pennsylvania, and crosses the Hudson at or close to Poughkeepsie, the same line prolonged passes near to Cincinnati, Louisville and St. Louis. With the exception of a short section west of Poughkeepsie, this line is traversed by existing railroads.

The idea of bridging the Hudson has been entertained for a long time, but the *possibility* of erecting a bridge which would not interfere with navigation is of recent date and the opposition of those who are interested in water carriage has been sufficient to defeat all projects which contemplated bridging the river near the water level.

Advances in the art of engineering have been very great during the past few years, and constructions are now easy which have been beyond the range of possibility; much of this is due to the invention of the cantilever.

The charter of the Poughkeepsie Bridge Company was granted by the State of New York in 1871, but the death of the principal subscriber to the stock, and the panic of 1873 brought the work to a stop after the expenditure of about $1,000,000 in preliminary work and the accumulation of material.

The bridge is accurately shown in the engraving and will be one of the most extensive and magnificent structures of its kind in the world. It will consist of five spans over the river channel, three of them cantilevers 550 feet each, and two truss spans of 525 feet each. The material is steel, and will be supported on tall steel towers resting upon stone piers 25x87 feet on top.

The bridge is to have two tracks and be of sufficient strength to support two trains each drawn by 85-ton locomotives, and a moving load of 3,000 pounds per lineal foot on each track. The bottom of the truss and the cantilever spans will be 130 and 160 feet respectively, above high water, and the track will be 212 feet above high water.

Last year the Manhattan Bridge Company was organized and acquired all the rights of the previous company. This new company made a contract with the Union Bridge Co. for the entire work of the foundation and superstructure, and on this contract operations were re-commenced in September, 1885. In the new plans now made, the charter requirements of 500 ft. clear channel openings and a clear height of 130 ft. below bottom chord were of course still adhered to, and the two foundations partly completed were to be utilized, and the new foundations sunk in similar open cribs. But the piers and superstructure were entirely changed. For the solid masonry piers of the old plan metallic towers resting on stone piers, 40 ft. high, were substituted, and the superstructure was changed to two connecting and three cantilever spans with the rails 212 ft. above high water. The dimensions of these spans were also controlled somewhat by the change in conditions on the west bank where the West shore R. R. now has its tracks.

At the bridge site the river has a depth of water ranging from 50 to 60 ft. The general character of the bottom is made up of a fine, soft mud and clay and sand mixed to a depth of at least 100 ft. below high water, when a firm, hard sand and gravel stratum was met with, overlying the bed rock, which latter was about 140 ft. below high water mark.

The crib was 69 ft. wide by 190 ft. long at the bottom; and for the first 20 ft. in height there was a cutting edge made of solid timbers shod with a 12x12 inch oak stick. All the timber used in the crib was 12x12 in. hemlock, saving the oak shoe before referred to. The triangular end portions formed close pockets to be used in sinking the crib through the mud, etc., and holding it down against flotation. Above the cutting edge the walls of the pockets were made of two thicknesses of timber, or 2 ft. wide. The longitudinal walls were firmly tied together by six cross walls (not including the end walls) each 2 ft. thick also, and starting just above the oak shoe. There were 14 clear openings each 12x12 ft. used for dredging pockets through which all the material was removed by the clam-shell dredge as the crib was sunk by the weight in the central and side pockets. The 12x12 in. timbers were so laid that the longitudinal and cross courses alternated in direction, and the spaces between in each case were closed with fillers of the same timbers. All halving or jointing of sticks was thus avoided and the entire mass was thoroughly tied in each direction, with solid walls from bottom to top. Each course was fastened to the one below by round 1 in. drift-bolts, 20 in. long, with 425 bolts to each full course.

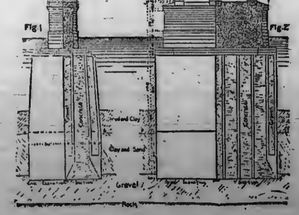
The actual sinking of the cribs to hard bottom was accomplished by dredging, under the usual conditions of such work, the cribs

hanging for a time and then descending with a drop of some feet at a jump, settling more or less out of level in either direction. Mr. O'Rourke, we understand, introduced some very practical modifications in the dredging practice which resulted in the better maintenance of the level of the crib in sinking. When hard bottom was at last reached the dredging pockets were filled with concrete deposited under water by boxes holding one cubic yard each and opened at the bottom by a latch and trip line. The concrete was made alongside the crib on a float especially fitted. This float carried a raised mixing platform with the concrete mixer set beneath; cranes on this float handled the boxes and deposited the concrete at a maximum rate of 300 cu. yards per day, which is an almost unequalled rate of progress. It should be remarked that before this concreting the weighting pockets had been solidly floored over with twelve inch timbers and the concrete was levelled off within them by the aid of divers.

A floating caisson surmounts the crib and carries the masonry on its six foo deck. The bottom of the caisson is six feet deep, made of twelve inch timbers laid in three two foot steps or courses. The sides are double layers of two inch plank, calked on the outside, with the angle pitched, covered with canvass and battened. Holding-down bolts and cross-girders permitted the sides to be removed as soon as the masonry was above the water sufficiently. The caisson was towed out over the crib and the masonry started, and when it would only float at high water (for the tide reaches this point in the river) it was exactly located and sunk to a final bearing by additional weights.

The piers are very handsome in design, and are built with a face of dark limestone laid in magnificent courses of 3 feet and upwards in depth and the interior filled with concrete. The surmounting coping is very pleasing in its effect, with just enough toolwork upon it not to detract from the mass and position of the pier.

This completes the general description of the foundations, and we now come to some of the difficulties of the work. The first trouble was found at pier 2. Here the old bridge company had completed the foundation, and had built its masonry pier to a height of 20 ft. above high water, with top dimensions of 22x68 ft. This was not a sufficient base for the metallic towers of the Union Bridge Co., which called for dimensions of 25x87 ft. and the old masonry had to be taken down and the pier widened and



lengthened somehow. But the old company had had trouble here too, and it came about in this way: In the old crib the upper eight courses had been calked, and a cofter-dam commenced upon it, and carried down with the crib until its bottom was 38 ft. under water. When this dam was pumped out, the upward pull proved too great for the holding power of the combined bolts and concrete, and the whole mass lifted several feet at the north end,

hanging at the south. It came down again when water was admitted, but the bolts and debris prevented a closer fit than 8 in. In this emergency a pneumatic caisson, 29x74 ft. in size was used to secure a bearing on the solid part of the foundation, and as a consequence the masonry was started 22 ft. below high water.

The Union Bridge Co. was thus compelled to sink a coffer-dam, 48x89½ ft. around the old caisson and masonry, and resting on the old crib at a point where its dimensions were 50x100 ft. This coffer-dam was made of two walls of 12x12 in. timbers with verticals of the same size between, and the packets thus formed were filled with concrete for 16 ft. in height and finished out with clay. Mr. O'Rourke says this last was a mistake, as it could not be rammed, and gave them trouble from leakage. The bottom of the dam was filled, by the assistance of the divers, with concrete, made with 2 parts of cement, 3 of sand and 6 of screened gravel. The masonry of the present pier is erected within the limits of the old pneumatic caisson, excepting only two end sections which carry no weight, and the old 8 in. rupture was boarded up tightly and Portland cement was injected through six 3 in. standpipes left for that purpose.

At pier 3, all rotten timber in the upper courses was replaced by sound sticks, and the dredging recommenced until its bottom was 126 ft. below high water. The center of the crib was found to be 5 ft. east of its proper positions, but as the crib is 60 ft. wide and the masonry only 25 ft. wide, this fact gave no trouble.

Piers 4 and 5 were entirely new and in mid-channel, and it was found to be a very difficult feat, at first, to hold them to their anchorage, before grounding. Commencing with pier 4, we have a weight to handle of about 5,000 tons, in an unwieldy form, and presenting an outside vertical area to the river current of 17,000 sq. ft. with several thousand additional square feet in the inside walls. The crib drew 52 ft. of water, and it was at first proposed to hold it by three up and three down stream anchors, but it was found necessary to employ 8 up streams 8 down streams and 6 side anchors.

The following extract from a letter of Mr. O'Rourke, engineer in charge, gives the present status of the work:

"The two shore arms were first erected on an ordinary falsework. Spans 2 and 3 were next erected on a false work, a part of which is shown in the accompanying figure, by means of a traveler, also shown in same. The false work consists of 26 bents, 22 resting on 24 piles each and 4 resting on the masonry. Of the latter 2, the outer ones rest on the piers, and the remaining two on the concrete in the bottom of the caissons. The two cantilever arms and 212 suspended spans between them, were next put in place, without falsework by means of the two travelers shown in the cut. The accuracy of all the work done is testified to by the fact that the last pieces fitted exactly in their places.

Meanwhile the falsework under 2 and 3 was removed and the foundation piling pulled up for use next season.

This closes the river work for the winter. Until spring, work will be confined to the erection of the viaducts for which nearly all the pony piers have been built."

The Chief Engineer for the Union Bridge Co. and the one in charge of the works is Mr. J. F. O'Rourke, while Mr. P. P. Dickinson still represents the old Poughkeepsie Bridge Co., and Mr. A. B. Paine is Chief Engineer of the Manhatten Bridge Co.

LONDON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

I HAVE forwarded you a copy of a new contract agreed upon by architects and builders of this city, and under which contracts for the coming season will be performed. I also send you a copy of the old contract in order that you may institute comparison between them. A careful persual will show great differences between the two. The revised contract calls for all plans and details to be prepared before tenders are submitted, whereas formerly the details were given as the work progressed. Under the old contract it was customary to pay 75 per cent. as the work advanced, and the balance in 60 days. Under the new contract 80 per cent. is payable as the work advances and the balance in 30 days. The principal change, however, is, that whereas formerly the contractor was bound by the decision of the architect on any matter in dispute, except deductions, now he has the right to appeal from any decision. These are the principal points of difference between the old and new contracts.

We do not anticipate any trouble here, and see no cause for it. There will not be a great deal of work offered this season, owing to the depression in trade, but we expect better things for the fall.

MONTREAL.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

THE following building permits were issued from the office of the Building Inspector, Mr. Lacroix, Montreal, during the month of February:—Jos. Vezina, 1 dwelling, Berri street, cost $1,800; F. Mandeville, 2 dwellings, Cadieu street, cost $2,500; Jos. Belanger, 2 dwellings, Papineau road, cost $3,600; L. E. Phillibert, 1 dwelling, Charron street, cost $1,500; J. A. Vanbooagarnt, 1 dwelling, Drolet street, cost $1,500; M. Galarneau, 1 dwelling, Dufferin street, cost $800; M. Dinning, 4 dwellings, frame, cost $3,600; F. X. Monette, 2 dwellings, Fullum street, cost $2,400; M. Gaurreau, 1 dwelling, Sherville street, cost $900; J. Lamarche, 1 shop, Josaphat street, cost $1,000; F. X. Chartier, 1 dwelling, Maple street, cost $1,500; G. Charbonneau, 1 dwelling, Maple street, cost $1,800; Jos. Chartier, 1 dwelling, Montcalm street, cost $1,300; Lapierre & Pagnette, 1 factory, Notre Dame street, cost $3,600; G. A. Chevalier, 1 3-story dwelling, Ontario street, cost $1,500; Chas. Laberge, 2 dwellings, Ontario street, cost $3,500; Patrick Stanford, 1 dwelling, Rivard street, cost $1,800; J. B. Durand, 4 dwellings, Ray street; cost $6,000; Zephirin Charest, 1 dwelling, Rachel street, cost $1,800; A. Dumoulin, 1 dwelling, Rivard street, cost $1,000; Richard Kendall, 1 dwelling, Richmond street, cost $1,300; P. Caulamlie, 2 dwellings, Rivard street, cost $4,000; C. Roussin, 1 dwelling, St. Lawrence street, cost $800; F. David, 1 dwelling, St. Denis street, cost $2,500; E. Carpentier, 2 dwellings, St. Dominique street, cost $2,500; N. Paquette, 1 dwelling, St. James street, cost $2,000; Jos. Surreault, 1 dwelling, William street, cost $1,000; M. J. Cummings, 2 dwellings, Wolf street, cost $3,600.

WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.

THE outlook for the building trades in this city is not of the most encouraging character. In fact, as far as public intimation has been given, there are few new buildings of any importance as yet projected. Messrs. Timewell & Son, architects, have just taken tenders for the erection of an addition to the general hospital which will cost about $9,000, and are preparing plans for a new maternity hospital and small theatre and operating room for the hospital. These are about the only works actually decided upon, though it is just possible that if the railroad negotiations at Ottawa result successfully there may be some change in the situation. There are a number of firms in Winnipeg that occupy business premises that are inadequate in character, and a number of citizens that have in contemplation the erection of residences in which to establish their homes. These two classes, although in many instances having plans prepared, have been holding back, awaiting the turn of events and uncertain of the wisdom of making investments.

The Contractor's Association at present is in *statu quo* from almost the same reason as given above, viz., the almost stagnation of business generally. There will be a great demand during the summer for carpenters, as there will be a great number of grain elevators built throughout the province.

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

I DID intend forwarding a list of the buildings to be erected in Hamilton as shown by the Building Inspector's book, but I was sorry to find that this book was no criterion to go by as to the building prospects. On the contrary I ascertained that notwithstanding the by-law passed in Council "that no person shall commence the erection of any building within the fire limits of the city of Hamilton until he shall have lodged with the Inspector of Buildings a notice thereof, to be entered in a book kept for that purpose," one half at least of the buildings erected last year were not so entered, and only a few of a large number of buildings that I know are in contemplation for erection on the opening of the season, are recorded up to the 7th instant. This state of things must not exist. The by-law must be enforced, and a recent complaint laid before the Council will no doubt straighten the matter out effectually.

From all reliable accounts the building prospects for the season are good, but already promise to be ruined by the unwise action of the bricklayers' union; which is already letting its thunder be heard. As can be seen in the daily papers, the union leaders seem strangely insensible of the injury they are doing to their own members by their off-handed dealing with their prospective patrons. If in this connection the leaders alone were the parties that would suffer, the matter would be of little consequence, but such is not the case. Means must be taken in the interest of the Building Committee and the mechanics themselves to counteract the paid efforts of these creatures of discord.

In the last issue of your journal I notice a very comprehensive article headed "An Appeal for Organization," in which reference is made to a letter in a previous issue. "Constans Fides" urges the revival of the Canadian Institute of Architects. That Institute was organized with the purest and best of motives, as a means of uniting its members in friendly intercourse for social and professional improvement, and its revival would certainly be productive of much good. The Architectural Guild, of Toronto, is a brilliant effort in a local direction, and promises to attain the object sought by developing into an incorporated association of architects, and there is little doubt that with the urgent pressure and claims of the rising generation of architects, whose eyes are open to the apathy of their predecessors, such an institution can and will be incorporated, but this incorporation will not certainly be the desired attachment unless the architectural name and profession is thereby protected against the usurpation of quacks to the same extent, at least, as the other learned professions. This is certainly the main question at issue, and now is the time to push the matter with united efforts to final success. I am glad to see that the growing interest taken in this journal is being evinced by the useful contributions made to its columns. In this connection all have a duty to perform in upholding a work of such real merit. Let the architect and engineer of long practice adorn its pages with useful essays from their fountains of knowledge for the benefit of those less favored, and juvenile brethren, and then feel the gratification of having availed themselves of the best possible medium for imparting a share of their knowledge and experience to those by whom it will be most appreciated. The elements of architecture afford a wide field for commentary, and lucid essays on acoustics and other kindred subjects would certainly be valuable matter for discussion, especially for the students, who would improve on the opportunity of entering the arena themselves and submitting their individual ideas and questions

There is another matter that has engaged the attention of architects, and is deserving of comment, that is the prevailing practice, among Canadian architects especially, of advertising for tenders. Some architects uphold the practice on the principal of right and justice to their clients, in providing them with a number of offers to select from. Others look favorably on the practice as a direct means of advertising the amount of work entrusted to them. But apart from any selfish motive whatever, it is a question at issue as to whether it is to the interest of the proprietor to advertise for tenders or not. For public works, of course, it must be done, for well understood reasons, but any architect in good practice must have a record of a sufficient number of contractors whom he can recommend for character and ability, and that he can invite to compete for the proposed work, with full assurance of all that is essentially fair and just to both his client and himself. This has always been the general mode of procedure by architects in Great Britain. However, circumstances alter cases, and much may be said for and against this subject, and as it is a significant one, it is very desirable to have the opinion of those most concerned, and for the mutual benefit of all. Your next issue will be anxiously looked for in reply to this question.

Concerning the new form of contract which has been adopted by the contractors in this city, a correspondent writes: The "Equitable Contract" passed by the Builders', Contractors' and Dealers' Exchange, has been passed in consequence of the great injustice they have repeatedly suffered through certain architects withdrawing the certificates given them in good faith, and putting the contractors to great loss, and forcing them into suits of law where the richer man can keep the contractor out of his justly earned money. The architects are perhaps not aware that the law on contracts specifically states that the proprietor and architect or engineer can be subjected to punishment for collusion to keep the contractor or contractors out of their money. This has been done, so the contractors have stated.

ANON.

IMPORTANCE OF CARPENTRY.

THE carpenter has more to do with the construction of a building than any other person employed by the architect. Whether a building is to be erected of brick or stone, still it is the carpenter who forms all the patterns and guides for the bricklayer or the mason to work from. Nay, even if a cottage is to be built of mud, the first step is to procure boards adapted by the carpenter for forming moulds, by which this mud is brought into the required form; or, even if the mud is heaped up with forks, as in the cob walls of Devonshire and Wiltshire, the carpenter is required to supply what are called wooden bricks to be built into the walls for attaching, at a future period, the internal finishings.

In the interior of the house everything depends on the carpenter, and most things are, indeed, done by him. The floors and doors and windows are almost entirely his work, and he forms mouldings for the cornices which are put up by the plasterer. If, therefore, we could improve the taste of the rising generation of carpenters, we should have no fear of operating, through them, on all the various artizans employed in the construction of houses, and ultimately, on the general taste of the whole community.—*J. C. London.*

ENGINEERING NOTES.

FROM the address of President Thos. C. Keefer, C. M. G., at the annual meeting of the Canadian Society of Civil Engineers, we make the following extracts:

If, as Engineers, our foresight were as good as our backsight, we would plan locks to suit the vessel of the future, instead of having to build vessels to suit the locks. It should be mentioned, however, that the dimensions of our locks were established by a commission representing the trade, of which commission the late Sir Hugh Allan was chairman.

We are about to start the Sault Ste. Marie canal, which, since Lake Superior has become an important entrepot of Canadian commerce is necessary to complete the Canadian system. It will, no doubt, be upon a much larger scale than any other Canadian canal, and, if so, will, I think, soon raise the question of a further enlargement of the Welland Canal, so that vessels which can now reach Buffalo may extend their voyages to Prescott, within a little over 100 miles from the ocean steamer.

The Pennsylvania Railroad is substituting stone arches for iron bridges where practicable, and the same question is attracting attention in England. The centralizing system by which bridge plans have been decided at the head office from profiles of the crossings has no doubt been responsible for many cases in Canada where iron girders and abutments have cost as much as an arch. The girder is always a bridge with all its contingencies; while the arch, where it can be depended upon, practically abolishes the crossing, and substitutes a causeway for a bridge.

Of future engineering works I can say but little. Our railway system penetrates all parts of the Dominion, and will extend itself wherever and as soon as required. The only remaining national railway not yet accomplished is the one projected to reach Hudson's Bay. I do not believe this will become an exporting route in competition with the St. Lawrence, nor that 500 or 600 miles of railway without local traffic or through connection, can be sustained by a few months ocean navigation in Arctic waters. The crop of the Northwest cannot be exported before navigation closes, and the railway will have little traffic to keep open its line during winter, because grain will rarely be sent to cool off for six months or more in elevators on Hudson's Bay. Our eastern trunk lines, with the advantage of a local traffic through our richest territory, cannot hybernate at Montreal and Quebec, but have been obliged to push on to the open sea.

I believe, however, that as a nation we should tap Hudson Bay at the bottom, in James Bay, where it approaches within a few hundred miles of our railway system in the Ottawa Valley. I believe the valuable fisheries, furs and other Arctic exports from an enormous coast line would gravitate southward to such a railway, and that its terminus would be the depot for a fishing fleet, which would compete with the whalers of the United States.

In bridges Canada has the finest samples of the various types, and the only tubular ones on this continent. While there is undoubtedly a surplus of iron in the Victoria Bridge, I do not think there is no unnecessary amount of masonry work in the piers. Its location and exposure to ice shoves require more massive piers than bridges where only running ice has to be encountered. Moreover, the liberal dimensions with the stream are sufficient for a second line of rails.

But we have a bridge project, which when carried out will in length of span be second only to the Forth which is 1661 feet. This is the proposed cantilever at Quebec. The car traffic of the Canada Atlantic has warranted that road in deciding to supersede a costly ferry system by a bridge, and let us hope that a similar case may soon be made out for Quebec.

The Railway Bridge over the St. Lawrence at Lachine recently completed by the Canada Pacific Railway is an example of rapid construction of the best masonry in a difficult situation, which has not I believe been equalled anywhere before—the work being done between the leaving and the taking of the ice in the same year.

The tunnel or sub-way to give railway connection with Prince Edward Island is another of the great engineering works proposed. It is difficult at present to say whether the physical or

the financial obstacles are the greatest, but when the money is forthcoming I have no doubt a way will be found to reach the Island.

The last great project I have to notice is the proposed ship railway between the Bay of Fundy and the St. Lawrence, located in the neighborhood of the route surveyed for the Baie Verte canal. I will not anticipate the paper to be presented to the Society by one of our members, who is the projector of the scheme, by an attempt to describe it in detail, but will only say: No route could be more favorable in an engineering sense for the inauguration of this new system. A practically straight and level line less than 20 miles in length, is available. I have the utmost faith in the practicability of the enterprise. There is no novelty in raising or moving vessels on wheels. France is now transferring torpedo boats between the Atlantic and the Mediterranean by rail. Ships have been hauled out on wheels, and been put back in the same water; the ship railway only proposes to carry them farther and put them in another water.

NOTES ON CARPENTRY AND JOINERY.

By Wm. Simpson.

THE following notes on the above subject formed the basis of a very interesting and practical address delivered by Mr. Wm. Simpson, Secretary of the Master Carpenters' Association, to the members of the Architectural Draughtsmen's Association of this city, on Feb. 27th:

Regarding joisting I would suggest that trimmers should, as a rule, be hung on iron hangers, or stirrups as they are sometimes called, with tie-bolt to bring snug up to trimmer joists. It is quite enough for the tail joists to be framed with the usual double tenon. I have on several occasions been called on to put supports at this point on account of the trimmers splitting.

For deafening I would recommend that felt be used in place of mortar, as being equally effective, and adding only a trifling weight to the floors. The value of felt will depend on its quality, and the number of thicknesses to be used.

I think strips should be used in brick walls, and plugs in stone. The strips should be kept at least half an inch from face of wall in order to give sufficient depth for rendering by plasterer. In many cases they are all but flush, so that to give the wall a proper coat the ground is lost sight of, and the carpenter is obliged to scrape off the mortar, or as is very often done, drive his nails into the bricks if they are soft enough to receive them. In many parts of the wall I have known the mortar to be not over ¼ inch, which can be of no service whatever.

I will also remark with regard to strapping that an error is very often made by the carpenter not furring out beams and trimmers coming flush with ceilings and walls. This neglect is the cause of so much faulty plastering, especially in staircases. In frame houses this is particularly noticeable, when the lath is nailed on the girth or plate as the case may be.

I consider that in all cases grounds should be used for trimmings, even when the joiner work may be fixed on the first coat of mortar. As to the grounds being bevelled, I do not think it is of much consequence, nor do I think that their being dressed is at all necessary. When the job is first-class I think the windows should have the ground and strap combined—that is, a piece 2x3 with ⅞x⅞ checked out, thus giving good and firm nailing.

The subject of roofing is so extensive that I will only offer a thought on the commonest treatment of the jack rafter. I think that in many cases the introduction of principal and purlines could be avoided by increasing the depth of the common rafters and collar ties, and by the use of struts or braces where the span is wide. I have seen principals of great strength on church roofs, but placed at such a distance that the purline was overtaxed, and, as a consequence, the dipping of the ridge would be quite apparent; and were you to cast the eye along the wall line at the eve, you would find that it was rounding considerably.

I will next give you my opinion as to the treatment of rafters when moulded at the line of cornice. You will readily see that it is difficult, as well as a laborious task, to mould the rafter on itself. I believe that more accurate work can be assured by the rafter proper terminating at the wall plate, and the mould portion being nailed or bolted on as a separate piece.

I have just a word or two to say on the subject of arches. You will have noticed that in many cases the elliptic arch is crippled to such an extent as to be painful to witness, and as the carpenter has usually to stand the consequences of the line being true, I would simply say that in my opinion the best method of describing the ellipse is with the trammel. I would also point your attention to a defect in masonry. You will have noticed what a variety of lines is in practice in the formation of the skewback of a flat arch. Now I believe I am correct in saying that generally speaking the bricklayers have no fixed rule to work by, and the consequence is the arches in many of our speculation buildings are scarcely self supporting. I think the angle of 60 degrees is the best and simplest rule for guidance in this matter.

On the subject of joinery I desire, first of all, to say that the carpenter has much to contend with in the matter of window finish, as no matter how carefully the frame may have been squared on the bench, or how plumb it may have been set, he often finds when he comes to finish that it is neither plumb nor level, and thus gives him much trouble should the window be finished with box shutters. This, of course, is all avoided when the building is of stone, as the carpenter then sets the frame with "screeds," and wedges it to its true position. The weight drags on hack pulley stile when made of thick material. Pulley stiles should not be more than ⅞ thick, instead of 1½ to 1¼ as is often the case. I might describe various methods of hanging shutters and blinds, for example, a separate shutter in front hinged to architrave, the shutter and blinds proper being hung to window casing, and thereby being concealed, the window presenting a finished appearance at all times, also a method lately introduced of sliding the shutter into a pocket similar to sliding doors.

In a jib head window the bottom sash should have the horn of stile left long and moulded so as to carry up the slip head without coming in contact with sash fastener.

The subject of stairs is to my mind one of the most interesting in the department of joinery, but I will have time to give it only a passing notice, and will simply refer to such points as may have happened to escape your observation. The dog-legged stair being the most common, requires no comment, but I would suggest that when the stair is a good one, and situated between walls, the first flight might be wider than the return flight. This will give the stair a finer appearance towards the hall, and show less soffit, besides giving more light to the staircase window. Where there are quarter landings I would suggest square newells where at all practicable in order to meet the different heights of rail. In an open newell stair I would also advise that the position of step be such as to procure equal height of newells on landing. In the treatment of a cylinder stair, it is advisable to diminish the step before reaching the cylinder, which will have the effect of lowering the height of rail over the nosing from pitch to pitch. With regard to the art of handrailing I would observe that the hard and fast rules as laid down by Nicholson and others need not be followed in their entirety, but should be humored to suit the hand as well as to appear pleasing to the eye. As to difficulties often met with in stairbuilding, these can best be overcome by the practical stair-builder if well skilled in the art.

The soffits of stairs in good buildings should either be sheeted or panelled according to finish. When a stair has a continuous rail string moulding should be eased, and mitred in a newel stair. Steps of inside stairs should have a fall of ⅛, and outside steps ⅜.

The proper height of rail over nosing is usually considered to be 2-6½, and the landings 2-8. As to the fixing of balusters, I think the better plan is to groove out the rail and cap of string with pieces set in between. The curtail step is of great advantage in fixing the newel, as well as enhancing the appearance of the stairs. In fixing rises and step it is best to tongue the riser into tread, but not the cove, as used to be the practice, and in all cases the joint should be plain at back of step.

In the hanging of doors the first thing to be done after the door is fitted is to apply it to the frame at right angles, and project the bottom hinge to suit any irregularity of the floor.

If possible, casings should not mitre through, but only as far as the first moulding, so that the other members may break the joint, thus preventing shrinkage.

When difficult to obtain thoroughly seasoned lumber for counter tops, etc., it is well to fasten same at the frieze and button down to counter framing.

DRIVING STONE HEADINGS WITHOUT EXPLOSIVES.

IN driving a stone drift at the Bois de Boissu Colliery, in the Mons District, Belgium, the strata were found to be so charged with fire-damp that it became impossible to continue the use of explosives. Recourse was therefore necessarily had to other means of carrying on the driving. The system adopted has shown itself to be adequate to the circumstances of this case, and is worthy of mention as a successful solution of a somewhat difficult problem. The rock was a very hard grit, lying in horizontal beds. A machine drill, of the Dubois & Francois, type, was employed on the face of the heading in the following manner: Across the middle of the face a row of holes was bored, from 3 to 4 inches in diameter and 3 feet deep, the distance of the holes apart being from 5 to 6 inches. When all these holes had been bored a special tool was substituted for the drills, having a rectangular striking surface 6 inches long, by 2 inches wide, and provided with teeth like a saw. By means of this tool the rock left between the holes was cut through, leaving a horizontal groove, varying in width from 2 inches to 6 inches, and of a depth of 3 feet, extending across the face of the heading. This groove was intended to serve the same purpose as the "holding" or undercutting in coal. Other holes of smaller diameter were then bored above and below the groove, and in greater or less proximity to it, according to the strength of the rock. Conical iron wedges of slow taper, placed in these holes and driven by the machine drill, provided with a hammer for the purpose, broke down the rock between the holes and the groove. These operations were continued until the whole face had been brought down, when an advance had been made of about 2 feet 8 inches. The shifts, which were of 8 hours, consisted of three men, one in charge of the drill and two laborers. The driller worked 18 consecutive hours. The average rate of progress made under these conditions was 8 feet 2¼ inches a week, the section of the heading being 6 feet 11 inches by 7 feet 2½ inches.

BUILDING PLAN ASSOCIATIONS.

THE receipt of a small book, well gotten up, as far as advertisements and general appearance are concerned, published by a building plan association in a western city, is the reminder that a note of warning should be given as to the character of these somewhat fascinating but very fallacious publications. The book referred to, like others of a similar description, contains designs of buildings purporting to be possible of erection at most absurdly low figures. It is about time that the public should realize exactly what such associations are. Any organization in any profession that pretends to cut rates to the extent they do must be dangerous. One can have no hold on them. They prepare plans in their offices for buildings which they say can be put up for a certain amount of money, often forty or fifty per cent. lower than the building would cost if erected by honest labor and from the plans of a responsible architect.

These organizations are formed either by "smart" business men or by architects who have failed to support themselves in the legitimate practice of their profession. They employ one or two good draughtsmen at a small salary and the portion of the business relating to the building plans is left in their hands. Frequently the men at the head of these organizations are capable only of misrepresenting and twisting facts to the beguilement of unfortunate clients, and the rest of the business is left to the draughtsmen. These last may be clever men with the pencil, but when they act as full-fledged architects they are apt to prove failures, not in the way of drawing an attractive design, but in the matter of estimating expenses. This point is the most important one, and the knowledge of it can be gained only by experience. No amount of books in regard to estimating can do away with the necessity of practical experience.

A case came to our knowledge but recently of a man living on a very moderate salary who, tempted by the advertisements of one of these "Plan Associations," procured a set of plans for a small cottage on the representation of the "Architects" (?) that it could be built for $1,500, bought a lot for $500 and prepared to build. He then obtained bids from builders and found their estimates far exceeded both his expectations and his means, and not having the money to erect the cottage he had to give up the idea of building and was left with a vacant lot on his hands which he could not use.

We are safe in making the statement that in seventy-five per cent. of the cases, plans furnished by these building associations can not be carried out for the amount of money stated by them, and we are willing to follow up this assertion by stating that a large proportion of such plans, examined by a responsible architect and estimated on by a reliable builder, will prove to be faulty. These organizations endeavor to catch the eye of the public by attractive books containing, in many cases, good designs of cottages and buildings, which will stand little or no scrutiny by a man who has any experience in architecture. A portion of the public, notably those residing away from the commercial centres, do not realize at all the duties of an architect. We urgently advise any one wishing to build that the first step necessary towards the guarding of his interests is the employment of a responsible architect. The fee paid to him for his services is well worth the money, and any one getting plans by other means will find out, sooner or later, that he has made a serious mistake.—*Building.*

Inspector O'Reilly in his yearly report to the Ontario Legislature says that the floors of the London jail need a thorough repairing. All the old brick floors should be taken up and replaced with flagging or good cement.

It is reported that the Dominion Government has decided to enlarge the St. Lawrence Canal to equal the proportions of the enlarged Welland canal. The work is estimated to cost $12,000,000. Of this amount the following sums will be expended during the coming fiscal year: On the Cornwall canal, $24,000; Lachine canal, $88,000; Williamsburg canal, $175,000

ARCHITECTS and contractors, says the *Sanitary News*, will be interested in the action taken by the National builders' association at its annual meeting in Cincinnati last week. The association decided that general plans, details and specifications, when offered for final competitive estimates, should be on a scale of not less than one-eighth of an inch to the foot, should be done in ink or some unfading process, and be complete in every part; such parts of the work as require a higher scale to be comprehended should be one-fourth of an inch to the foot; specifications should be definite; estimates should not be made to cover an indefinite depth of foundation, but where the soil requires going below the depth indicated on the plan, it should be paid for as extra work at agreed prices; the specification is to be the guide for estimating, and all demands made by the specifications, unless objection be made thereto in writing when the bids are submitted, should be covered in the estimate offered; improper demands made by plans are not to be considered; grouping of special work must be mentioned and placed under appropriate headings; specifications must distinctly state when it is necessary to cut or change the work of one mechanic in placing the work of another, and such work should be cut or changed by the mechanic who put it in at the expense of the mechanic for whose accommodation the change is made; contractors are not to be restricted as to sub contractors, without notice; on reserved portions of the work, let by the owner to a third party, the principal contractor should receive 10 per cent; the lowest invited bidder, whether a general or sub-contractor, should be given the contract and estimates for changes should be made only by him, unless the changes involve a complete alteration in the plans, and then the full competition should be again opened; in no case are the lowest two bidders to be called upon to estimate upon changes to see which shall have the contract; if the price estimated for changes should not be satisfactory to the owner, it should be settled by arbitration. Compensation for the lowest bidders when all estimates are rejected is demanded as follows: For estimates amounting to $5,000 or under, $25; $5,000 to $50,000, $50; over $50,000, $100. When security is demanded of the contractor, a like sum should be given by the owner. A good deal of discussion was indulged in on the rights of sub-bidders in the hands of architects and the general contractors—unsolicited bids—and a rule was passed to the effect that any member detected in trading on any of the sub-bids will be liable to forfeiture of membership, censure or suspension. It was also decided that bids should be opened in the presence of bidders when practicable, and that when a penalty is demanded for delay in completion beyond the day named, a premium of like amount be awarded the contractor for completion before the time. These remedies, some of them, are new, but all seem to be just, and we await with interest their practical operation.

Geo. Duthie & Sons, roofers, Toronto, have dissolved

A varnish factory has been started at Woodstock, Ont.

Building will be lively at Georgetown, Ont. next summer.

The citizens of Coldwater, Ont., are calling for more cottages.

The new Baptist church at Woodstock, Ont., will cost $9,500.

Wyoming, Ont., expects a boom in the building trade in the spring.

The prospects for the building trade in Alvinston, Ont., are very promising.

A new post office, costing $30,000, has just been completed at Peterborough, Ont.

The work on the C. P. R. hotel, at Banff, N. W. T., is being rapidly pushed forward.

A large number of dwelling houses will probably be erected at Cannington, Ont. next summer.

It is expected that not less than $50,000 will be expended at Neepawa, Man., in buildings next season.

The new public school building at Seaforth will be built by Mr. John Lyons at the contract price of $3,675.

Contractor Joshua Garrett has commenced operations on the new graded school on Simcoe street, London, Ont.

The Peterboro' Bridge Company has received the contract to build a new iron bridge at the Narrows, Orillia, Ont.

The Salvation Army of Peterboro, Ont., are building a new brick temple, with seating accommodation for 1,000 people.

George Hildebrand has the contract to build the new residence for the pastor of the Lutheran church New Hamburg, Ont.

Six or seven members of the Builders' Exchange, London, Ont., who were expelled last summer, will be reinstated at an early date.

The congregation of St. Catharines' church, St. Catharines, Ont., has just closed the contract for the enlargement of their building.

The building of the new city hall at Halifax, N. S., has been taken out of the contractor's hands, by the council. A law suit will be the result.

The Canadian Pacific is to build a house on each quarter section in the Belgian colony, near Calgary, on which three hundred families are expected to settle in time to commence spring work

Mr. John Redwood, contractor, has just finished another tall chimney for Bell & Co.'s new organ factory, Guelph. The chimney is 90 feet high and contains between 33,000 and 34,000 bricks.

Mr. Thomas Grayson, contractor and builder, of Moosomin, N.W.T., will shortly commence the erection of a large stone house at Cannington, Moose Mountain, for Mr. Hanson, an English gentleman, who proposes starting a ranch.

Mr. W. J. Burroughes, plumber, gasfitter and founder, of this city, assigned last month. Messrs. S. M. Marchment & Co., manufacturers of inodorous closets, plumbers, etc., of this city, succeeded in effecting a compromise with creditors.

Messrs. Timewell & Son, Architects, Winnipeg, Man., have a scheme for erecting forty elevators throughout the province, to be situated in municipalities that will give the necessary bonus of $500 towards the construction of each 40,000 bushel elevator.

CONTRACTS

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

LEAMINGTON, ONT.—A new public school is soon to be built.

CAMBRAY, ONT.—Mr. R. James is preparing to build a public hall.

ALMA, ONT.—The people have decided to build a new English church.

LONDON SOUTH, ONT.—The Baptists are going to build a new church.

GRAVENHURST, ONT.—A new English church will shortly be built here.

EASTMAN'S SPRINGS, ONT.—There is talk of putting up a big hotel here.

COLDWATER, ONT.—Mr. J. C. Arnold will build a new brick store this season.

YARMOUTH, N.S.—It is proposed to remodel and enlarge the Yarmouth Hotel.

UXBRIDGE, ONT.—The Methodists propose building a new church this year.

BLENHEIM, ONT.—Arrangements are being made for building a new English church.

NIAGARA, ONT.—The Methodists are to have a new brick Sunday school this spring.

GEORGETOWN, ONT.—The site occupied by Clarke's hotel will be built up next summer.

BROOKE, ONT.—S. S. No. 9, intend building a new school house this coming summer.

OAK LAKE, MAN.—Alford & Co. will rebuild their hotel recently destroyed by fire.

LETHBRIDGE, N. W. T.—A number of new buildings will be erected here in the spring.

MILLBROOK, ONT.—The block of buildings recently destroyed by fire will be rebuilt as soon as possible.

KINCARDINE, ONT.—$8,000 will be expended by the Government in improving the Kincardine harbor.

PORTAGE-LA-PRAIRIE, MAN.—The Methodists are collecting funds to build a new church next summer.

RAT PORTAGE, ONT.—J. W. Humble, merchant, will erect a new store, to be built of stone, 20x50 feet.

REGINA, N. W. T.—J. A. McCane intends building a three storey, seventy-five room hotel this season.

BEAVERTON, ONT.—The Town Council are considering the question of the erection of a new Town Hall.

FOREST ONT.—Over $2,000 has already been subscribed by the members of Christ church for their new building.

OTTAWA, ONT.—The Congregationalists, of this city, have decided to build a new ten thousand dollar church.

SOUTH WINCHESTER.—Arrangements are being made for the erection of a new Anglican church and parsonage here.

NEW WESTMINISTER, B. C.—Local architects are preparing plans for a dozen or more new houses to go up in the spring.

HILLSBURG, ONT.—The brick, sand and stone is now on the ground for enlarging, beautifying and remodelling the Baptist church.

TILBURY CENTRE, ONT.—Mr. Duck, Architect, Ridgetown, is preparing plans and specifications for the proposed new English church.

WESTMINSTER, B.C.—Contractors are getting ready to proceed with their contracts. Several houses have already been commenced.

SAULT-STE-MARIE.—It is reported that a syndicate with Mr. R. M. Caldwell, of Toronto, at its head, is about to build a $43,000 hotel.

STRATHROY, ONT.—An official of the Government has been here selecting a site for new public buildings. Contracts will be let shortly.

PARKDALE, ONT.—A large brick block will shortly be built on the south side of Queen street, between Close and Jamieson Avenues.

STRATFORD, ONT.—The plans for the proposed addition to the Waterloo Street Methodist church are out. The addition will cost about $3,000.

PETROLIA, ONT.—Building operations will be brisk here the coming season. Among the proposed new structures will be a 3 storey Oddfellows' hall.

BRANTFORD, ONT.—The School Board has requested architect Broughton to report with reference to proposed alterations to the Central school.—A new school house to cost $2,500 is to be built at Pleasant Ridge, near this city.

FORT WILLIAM, ONT.—The Canadian Pacific Railway Company intend erecting car shops and a large elevator, besides doubling the capacity of the docks.

BELLEVILLE, ONT.—About $5,000 will be spent in remodelling John street church. The improvements will consist of a new half horse-shoe gallery, large pipe organ, iron pillars in place of wooden ones, and new seats arranged in amphitheatre form, new paint and tinting.—The Grand Trunk workshops are to be enlarged in the spring.

KINGSTON, ONT.—St. James church is to be enlarged in the spring.—Improvements will shortly be commenced to Queen's University buildings.—The congregation of Chalmer's church will build a new church to cost $25,000.

LINDSAY, ONT.—The contract for the new Collegiate Institute has not yet been awarded. Only two tenders were put in and they were both too high. The building committee has decided to ask for separate tenders from the different trades.—The Lindsay and Ops Boards of Health have united and have decided to purchase or erect a suitable building for a hospital for contagious diseases.

LONDON, ONT.—A wealthy citizen has placed $10,000 in the city solicitor's hands to be set apart as an endowment fund for a city hospital on condition that the building be erected on a certain site located by him.—A new small-pox hospital will probably be erected here shortly.—Alterations are contemplated in the Mechanics' Hall which will afford accommodation for the proposed free library.—Architect Geo. Craddock is calling for tenders for building the Medical School here. Tenders are to be in by Saturday, March 17th. Probable cost, $10,000.—Gould & Stratford, plasterers, have secured the contract for plastering the Church of Our Lady in Guelph, of which Joseph Connolly, of Toronto, is the architect.

TORONTO, ONT.—The plans and specifications and also the probable cost of the proposed new Board of Trade building will likely be submitted to the Board at an early date.—The special committee appointed by the Council has decided to establish a second Collegiate Institute in the city, and will have a consultation with the High School Board regarding the site and cost of building.—An architect will be appointed by the Council to report on the best method of enlarging the gaol building.—Two or three new schools to be erected, and some of present buildings to be enlarged. Estimates are also wanted for improved heating and ventilating apparatus. Address Secretary Public School Board for particulars.—The government will ask tenders for the erection of a cavalry school shortly.—The following building permits have been issued at the office of the City Commissioner during last month: David Walker, five one-storey and two two-storey attached brick stores, north-west corner York and Front streets; R. Heath, 3 stores and alterations, College, near Markham street, cost $3,500; Hall & Son, 2½ storey brick addition, 223 Queen street, west, cost, $1,500; Chas. Bansley, 4 one storey and mansard r. c. dwellings, S. W. Cox, Seaton street, and Wilton Avenue, cost $2,300; Rev. Mr. Glover, 2 storey brick house, Lowther Avenue, cost $3,000; Douglas Scott, 2 storey and attic, McCaul street, cost $3,000; Scott & Cross, pair s. d. 2 storey and attic, Gordon Ave., Rosedale, cost $6,000; J. P. Kersey, 3 storey brick store and 2 storey brick addition, 562 Queen street, cost $4,000; Land Security Co., stables and blacksmith shop, Richmond st., w., cost $10,000; John Wickson, addition and alterations to 744 Yonge street, cost $1,000; Jas. Hewtett, three 2 storey and attic attached brick dwellings, Ontario street, near Wellesley, cost $7,000; H. Reynolds, two one storey and mansard r. c. dwellings, east side Darling Ave., cost $1,050, and three of same kind west side Darling Ave., cost $1,350; W. H. Sexton, pair s. d. 2 storey r. c. dwellings, Bleeker, near Howard street, cost $2,300; W. Simon, pair 1 storey and mansard brick dwellings, 119 and 121 Queen street west, cost $1,600; Jas. Nealon, brick hotel, King street, east, cost $12,000; John Wighton, 2 storey brick dwelling 612 Bathurst street, cost $2,500; J. Anderson, pair 2 storey and attic r. c. dwellings, 167 Bleeker street, cost $2,000; A. Herren, storey and attic brick dwelling, D'Arcy street, cost $2,000.—The Sanate of University College will recommend the Government to provide funds for erection of a new science building to cost $45,000.—The Eastern Branch of Women's Temperance Union will build a new hall.—The undergraduates of Toronto University propose to erect a union building to answer the purposes of club rooms, gymnasium and society rooms. It is expected to cost about $25,000.—Architects King & Gouinlock report: Block of stores, offices, etc., corner Queen and McCaul sts., cost, $15,000; business block, Queen street east, cost, $18,000; two stores with dwellings over, in Parkdale, cost, $8,000; four residences, costing on an average $7,500 each, also several fine residences and two large blocks outside the city.

THE WATER JET IN PILE-SINKING.

SPEAKING of the discovery of the value of a water jet in sinking piles in sand, a correspondent of the *Engineering News* supplies some interesting particulars. It appears that in 1859 or 1860, Capt. W. H. Stevens, afterward a brigadier-general in the Confederate army, was engaged in constructing an iron lighthouse near Galveston, Tex. The platform carrying the plant for sinking the screw piles intended for the foundation was wrecked by a storm, and the mass of iron-work was soon firmly embedded in the quicksand beneath. In the attempt to recover the lost material, Capt. Stevens donned a suit of submarine armor and went down to study the effect of a jet of water in loosening the buried members of the lighthouse. He soon discovered that he himself was firmly anchored in the quicksand, and on applying the jet to his feet, with the intention of freeing himself, was soon buried to his waist. However, signalling to his men to hoist, and at the same time stirring up the sand with the jet, he was rescued without difficulty. The experience was not lost upon him, and shortly afterward he successfully applied the jet action in sinking piles in sand.

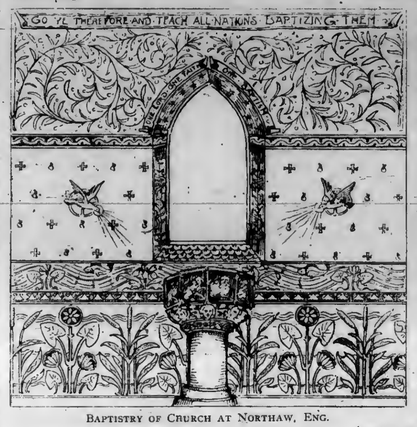
As a matter of interest, it may be well to state that during the American war Col. S. H. Lockett, chief engineer of the Department of the Gulf, in this manner filled the Bay of Mobile with obstructions, sinking trunks of trees 3 feet in diameter, and sharpened at both ends, in the sand and firmly anchoring them there by the use of a jet from a common fire engine on a steamboat. The piles were planted from 12 to 20 feet deep, and they settled in the sand at the rate of 12 inches per second under a jet from a 1½ inch nozzle on a 3¼ inch hose. The nozzle was held by two staples down near the point of the pile, and was secured there by a small rope passed through the staples. Five thousand piles were thus put in.

Decoration

INTERIOR DECORATION.

By E. N. Rich.

WHILST so many important structures are being added to the list of great buildings in our cities, a few suggestions on the above subject may not be considered out of place. Considering first ecclesiastical decoration, the opinion is ventured that many crude and hazy ideas are held on the subject of beautifying the interior of sacred edifices, even by some who should be authorities, cramping their efforts in this desirable direction with unnecessary limitations and slavish adherence to absolute rules and traditions. If the same breadth and freedom permitted in more secular work were applied on the walls of a sacred edifice, not only would there be no "irreverent Philistinism," but more true worship in the sense that Ruskin preached it, by adhering more closely to Nature, and inferentially acknowledging the universal sway of her great Author. My idea is, in whatever form of decorative art, we should go to Nature first and always, not for leading ideas only, but continually renew touch with earth to regain vitality. As Achilles did, keep to Nature in the design, and in the execution of every detail of that design. As an embodiment of this theory in ecclesiastical decoration, subjoined is a sketch of the baptistry of a church in Northaw, Herts, England, recently executed by the writer, with, it may be added, satisfaction to architect, donors and all concerned. The ground panel consists of a broad belt, whereon are depicted in conventional form water lillies, cats' tails (or bull rushes), vellum ornament on a ground of three blues with gold water lines. Next there is a cresting of gold shells on a terra cotta ground, water plants on water lines, with gold and silver fish. Above that is a blue ground with diaper of tongue of flame and cross in gold, centre of dove white, with gold rays pointing towards font. The border above is on blue ground and represents clouding. Above that again, on a vellum ground, is an olive pattern, Waterbouse brown with gold olives. The splays of windows are lillies with scrolls and appropriate texts, on same ground as cross, and frame with pale blue ground and gold stars in upper part.



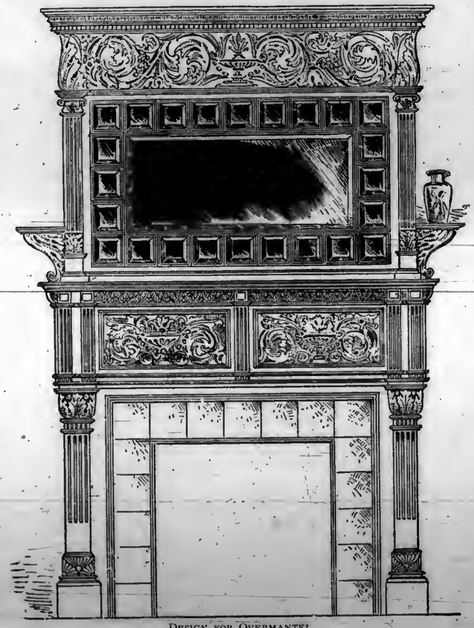
Baptistry of Church at Northaw, Eng.

All this, though conventional in arrangement, and conforming somewhat to the character of the surrounding features of the building, nevertheless admits of natural forms being retained and the matchless harmony of tints that Nature alone displays to those who will diligently seek for them. We know of her more pronounced moods—her dying sunsets, and the glories of her autumn foliage—but how many decorative artists seek for samples of her more subtle graces—her symphonies in grey and silver, sunrises and sombre settings. At our very feet lie neglected lessons in the kitchen and moss on the trunk and root of hoary forest trees, the boulders on the hillside, or shells and pebbles on the sea shore.

One of the greatest decorative artists of the age, the late Clement Heaton, of England, decorated the interior of Eaton Hall the residence of the present Duke of Westminster. During the three years I was engaged on that one interior, under the supervision of Mr. Heaton, the designer, I learned many useful lessons. So complete a practical designer, and so enthusiastic a lover of Nature was the principal, it was almost impossible to avoid the contagion of his enthusiasm. So thorough was the adhesion to Nature, for instance, that the Duke's keeper had instructions to supply the artist with any thing alive, from a deer to a squirrel, or a hawk to a robin. Conservatory and garden were ransacked, all fruit and foliage laid under contribution, and yet there was no attempt at *picture painting*; all was conventionalized and subservient to a well-digested plan, but Nature, pure and simple, was the keynote that ran through all.

To briefly apply one of these lessons, bear in mind that in determining the prevailing tint for a room, regard should be had not only for its purpose, but also for its aspect, as thus: giving warm, comforting hues to the north, and cool, refreshing tones to the south.

As an idea for a dining room, take in the rough as follows: A rich brown band at base to represent earth, with the greens in tone and in conventional form of shrubs, plants, grasses, frogs, mice or other "small deer" for greater animation; then trees with fruit, birds in keeping, and finally sky, with birds on the wing: you would thus have skirting, dado, cresting, filling, frieze and ceiling.



Design for Overmantel.

Take a drawing room and treat it similarly as to subdivision, but adhering mainly to flowers and flowering shrubs, with medallions, perhaps, of poets, musicians or painters.

Halls and stairways may have a continuous pattern, with Æsop's fables. An ornamental arrangement for a staircase is a climbing squirrel on ascending pattern, combined with a hazel nut. Many such quaint suggestions in adapting Nature to ornamental forms, the west has learned from the "most eastern east"—from Sepoy, Burmese, Chinese, or last of all, Japanese artists, where, through every quaint line of the most pronounced national character Nature can be easily traced. An almost infinite variety to suit every phase of public or private life, could be made of objects of permanent beauty on these lines.

These rough suggestions are thrown out in the hope of inducing art lovers to accept the principle I have tried to enunciate, and the practice of which would inevitably awaken purer harmonies, greater service to true art, and more reverend and devoted love for Nature.

COLORS IN DECORATIVE PAINTING.

THE most valuable colors in decorative painting, says the *Decorator and Furnisher*, are the ochres, which vary from a bright, though not vivid, yellow, to a color nearly approaching a tawny brown. The best ochre produces quiet tints in white and other colors, including a valuable green when combined with prussian and other blue. In combination with vermillion, Indian and Venetian red, it produces refined and quiet colors of great value. Most useful reds are light red, Indian and Venetian red; these may be lightened to any required degree with vermilion. The three reds produce good ground colors when mixed with white, white and yellow ochre, or white and black. Lake and vermilion produce a rich crimson. Of all blue pigments, blue ochre is the most permanent, and prussian blue the most useful. Blue, combined with white, is of the utmost value to prepare permanent greens, and produce pleasant tones. Cobalt blue is highly commended for preparation of clear, bright blues. The finest small blue is durable and useful, being unaffected by lime. As a general rule, blues, with a slight greenish tint, are more pleasant in decoration than those which incline to purple. Greens for decoration should, as a rule, be mixed with pigments. The ordinary greens of commerce cannot be depended on. Bright and shining greens should be sparsely introduced being too hard and forcible, but all tones of suitable green may be found in autumnal foliage. Such greens are readily produced with prussian blue and cobalt blue, and permanent yellow with the ochres, lemon, yellow, and raw and burnt sienna. To compounds of these Indian and Venetian reds, Vandyke brown and burnt umber may be added. All greens may be brightened with bright and lemon yellow. Lake, vermilion, Venetian and Indian red are to be valued for the bright intensity of their colors. All colors of a decidedly neutral character prove tame and ineffective. Beads and chamfers, in gold and gold and black, are always appropriate and telling in effect on panels. Lines of light or full colors should be sparingly used on borders, finials and crockets in flat paneling. In the painting of mediæval times, it is noticeable that pure colors are rare; these are most generally toned, and with admirable effect. The absence of the primaries is a rebuke to the writers on theory colors, who lay down in a way to indicate the presence of such colors as indispensable to rich decoration, the porportions in which they should appear. The toning of colors is a very simple matter, but it requires system. The adoption combination changes colors. Where the form of pattern undergoes repetition in stenciled ceiling, bands is the most satisfactory made, as it helps to remove, in a considerable degree, the unavoidable hardness of such bands, and a quiet effect will be secured by bringing the counter-changed colors close to one another in intensity

A good ground for dark oak is made of pure white lead, golden ochre, and royal red. Deep orange chrome is sometimes used for ground for dark oak when a bright tone is desired. The graining color is made of burnt sienna, raw sienna, and Vandyke brown.

Slightly tinted green glass is introduced by decorators in certain rooms having abundant light, as grateful to the sight and having a subduing influence on the decoration.

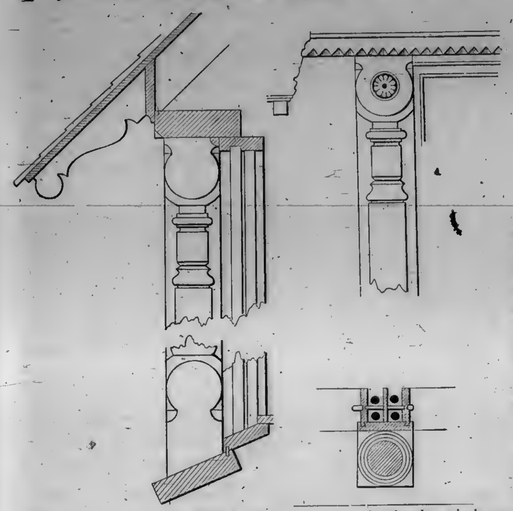
THE highest art education is that which fits one for the making of a home—*a home*, not a storehouse or curiosity shop.—*Edmund Russell.*

A picture we may pass by, and seldom study or feel. It tells a story, and we go to it when we want to be interested. The color of our walls we dwell in; it surrounds us as sunlight and atmosphere; it does not speak to us, but envelopes us; it forms our material environment, and is as subtle in its effects as our spiritual one. Color is the moral element of the material world.—*Edmund Russell.*

Sanitation Light and Heat.

HEATING AND VENTILATING SCHOOL HOUSES.

THE principle and aim of ventilation are thus explained in the United States work on School Architecture:—"Briefly, the aim of ventilation should be to maintain a steady supply of fresh air and withdrawal of foul at all parts of the room, removing the products of respiration and organic particles as fast as thrown off, and leaving no corner stagnant or unswept by the purifying current."



Figs. 1 and 2.

Figs. 3 and 4.

The author adds:—"Nothing can take the place of aeration by means of open windows. Artificial ventilation, though required for changing the air when the windows are necessarily closed, is insufficient, even under the best of circumstances, unless the room is from time to time thoroughly refreshed and purified by the sweep of the free winds through all its windows widely opened. Such an atmospheric washing should be secured three or four times daily in all weathers. The process affords opportunity for this. No fixed transoms or immovable arched bends should be permitted to exist over windows.

Besides the general airings, in which all the windows are thrown wide open, it is possible and very desirable during three-fourths of the year to keep some of them partly open. If they extend to the ceiling, as shown in fig. 1, the upper part at least of the south windows, in rooms properly supplied with other fresh air inlets, may be pretty widely opened in the coldest weather without causing a noticeable draught. Such openings, if on the leeward side, often interfere with the action of extraction shafts by drawing to themselves the current of escaping air; but this, with care, might be minimized.

There are times, however, when the windows cannot be opened with safety. But means must be taken for ensuring the withdrawal of the respired air from the room in some other way. Dr. D. F. Lincoln, in the report to the New York State Board of Health on School Hygiene; speaking of window "air inlets," says of them:—

"No apparatus that can be named will do as much good, at a very small cost, as the window board—that is a plain piece of board, as long as the window is wide, and from four to eight inches in width. The lower sash is raised, the wood is inserted and the sash is shut down upon it. The air enters (as shown in fig. 5) in a thin stratum, passing upwards between the upper and lower sashes in a nearly perpendicular direction, without causing perceptible draught. Fig. 5 (to the right) represents a double window provided with a board, the air entering at A. This gives great protection from the cold, and also enables the air to enter the room slightly warmed by contact with the lower pane. All four sashes of double windows should be moveable. At B (in the other window) there is a different arrangement for mild autumn or spring weather. The board is made wider and is placed an inch or two from the sash, in such a way as to direct a current upwards. The arrows indicate the direction of the currents entering the room through each kind of window when the boards are arranged as directed.

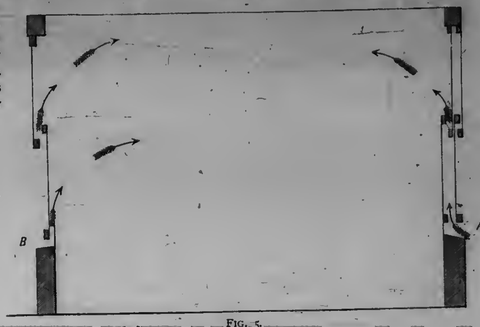


Fig. 5.

Dr. Oldright, in his paper on "*Heating Homes*," published in the report of 1883 of the Provincial Board of Health, makes the following suggestions for dealing with windows without pulleys, by—

1. "Having a piece of board nailed on to the top sash of the window, slanting upwards, to direct the current in that direction.

2. "Raising the lower sash and filling in the space left under it by a piece of board, as shown in the accompanying diagram. The air gets in through the space left between the lower part of the upper sash, and the upper part of the lower one.

3. "A board placed just inside the lower window frame will act in the same way when the latter is slightly raised.

4. "Placing wire screens in spaces of entrance of air. Sometimes they are tacked to the window frames and folded up when the windows are closed.

5. "By louvred openings.

6. "By double panes, with an open slit at the bottom of the outside one and at the top of the inside one, thus giving an upward current.

The ordinary system of heating rural schools is by means of a stove. In most cases this system is unaccompanied by any plan of systematic ventilation, or of securing pure air from *outside* the building. The door and windows (the latter often tightly shut) are often depended upon for such fresh air as they may casually admit to the school room. Efforts have been made by our Public School Inspectors to remedy this great evil, and to introduce a system of heating by hot air, a system the very principle of which is to displace the vitiated air already in the room. An example of an Inspector's success in this direction is furnished by Mr. David Fotheringham, Inspector of North York, in the shape of a plan of heating by hot air, which has been adopted, on his recommendation, by the trustees of a public school near Newmarket. Mr. Fotheringham has furnished a

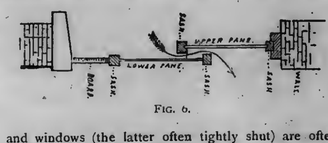


Fig. 6.

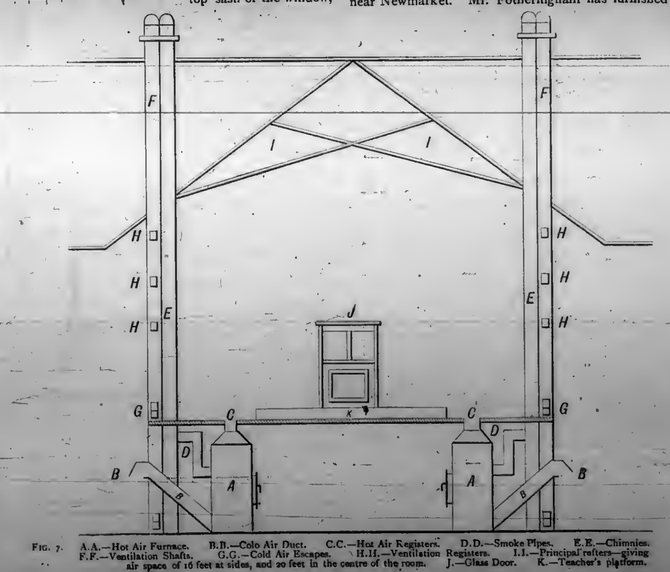


Fig. 7. A.A.—Hot Air Furnace. B.B.—Cold Air Duct. C.C.—Hot Air Registers. D.D.—Smoke Pipes. E.E.—Chimnies. F.F.—Ventilation Shafts. G.G.—Cold Air Escapes. H.H.—Ventilation Registers. I.I.—Principal rafters—giving air space of 16 feet at sides, and 20 feet in the centre of the room. J.—Glass Door. K.—Teacher's platform.

copy of this plan, which is inserted herewith (Fig 7). He says :-

From the accompanying diagram (Fig. 7) you will understand my plan for ventilation. While I should avail myself of the ordinary means, through raising and lowering windows, and by ventilators in the ceiling and gable ends, I should have a shaft in connection with the chimney, composed either of a section of the chimney

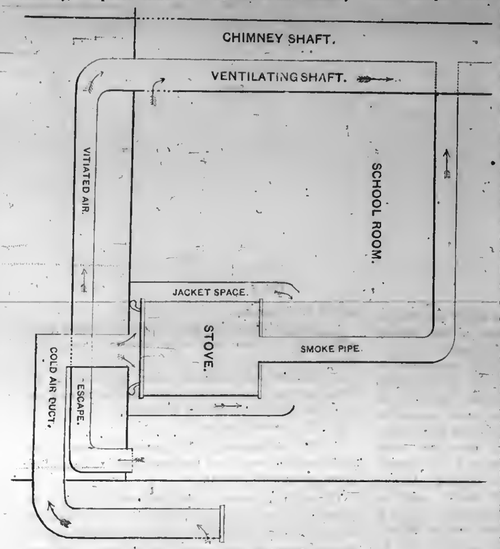


FIG. 8.

divided off by sheet iron (which would heat the air in the shaft), or by a pipe inside the chimney, either for the smoke or for ventilation. You will notice that I suggest cold air escapes at the floor into the basement, or into tubes opening outside the building ; higher up I suggest large ventilating registers to be under control of teacher.

Although a furnace or heater, in the basement, as illustrated by Mr. Fotheringham, is considered the best means of heating school rooms, yet the plan of heating them by stoves in the school room, is the most common. Without certain arrangements and precautions, this is a very faulty and unhealthy system. As a general rule, no provision is made for ventilation by the constant production of warmed air and the exit of vitiated air. The stove is often placed at one end of the room, and the pipe is carried over the heads of pupils—to their serious detriment. The only way to obviate these defects, if a stove must be used, is to place it near the north-east angle of the school room, and bring fresh cold air in from the north side of the school house, in the manner illustrated in the accompanying simple diagram.

It will be noticed, that in Fig. 9 one of the escapes for vitiated air is under the teacher's platform ; others are under the desks, etc. In no case should the fresh air be admitted from the ground level outside ; but it should be invariably taken from about three or four feet above the level, through an air duct, as shown in Fig. 8 with wire gauze covering or a register. The following illustration shows what would be the practical working of such a system in the school room :

The Cottier system of ventilation, recently adopted in the school houses of Portland, Oregon, has worked well. It is based upon the use of the attic as a warm air, or expansion chamber, out of which there is an ejection through the roof into the open air. From a detailed account by Mr. T. H. Crawford, City Superintendent of the Portland City Schools, has been condensed the following summary on the subject :—

"The tin flues for vitiated air used (four in each room) are ten inches by four in size. They reach from the rooms to the attic, and extend a few feet above the attic floor. To ensure a strong draught, hot-water coils (or hot air through flues will answer), are placed in the attic, some feet above the floor. To enforce a more rapid ventilations a gas burner is placed in each tin vitiated air flue, five feet from the floor, with a glass door opposite to it in the flue. The attic, or expansion chamber, is made air tight, and all doors leading to it closed. Hot air pipes are placed under the windows, etc., on two sides, or on one side and end, of the room. The warm air rises and receives the cold air from one-inch openings at the top of the windows and by transoms over doors. The openings are so small and numerous that no sensible draught can occur."

A Medical Commission was appointed in Germany not very long since, to report on certain questions relating to school house construction. In the report which the Commission prepared, it was laid down that 2,120 cubic feet per hour for each pupil was the minimum quantity of fresh air which should be supplied to each pupil. The Commissicn stated that in the best arranged ventilating shats, of metal, fitted with gas-flames, stoves, or other artificial means of promoting the draught, the upward current of vitiated air will occasionally reach a velocity of a thousand feet per minutes in cold weather, although the average, in ordinary cases, is rarely more than five hundred feet and generally much less ; so that to ventilate a room containing sixty pupils thoroughly, it should have an outlet shaft of four square feet or more, in sectional area, to be even capable of such ventilation as is essential.

In conclusion it may be well to emphasize the statement in a recent report of the Board of Public Instruction for the City of Albany, N. Y., that no system of ventilation is automatic. And unless teachers will themselves attend to the regulation of the temperature of their room, and act upon the directions ordinarily given, not even in the most perfect system of heating and ventilation will keep room free from foul air, and the inmates from discomfort.

PLUMBING AND DRAINAGE.

By B. Kirk, Plumbing Inspector, Toronto.

TORONTO'S plumbing by-law has, in spite of many defects, worked good results. It has made the way of the skin plumbers hard. Better material is used, and the construction is much better. The standard of workmanship also is being elevated, which is the natural result of close inspection by practical men, the plumber being encouraged to do his best when he sees his work closely scrutinized by the inspector, who is constantly comparing the quality of his work with that of other plumbers.

There bave been nineteen informations laid in the Police Court for violation of the by-law. Seven of these were against plumbers; the balance were against owners and builders for improperly laid drains. Convictions were secured in each case, but owing to ignorance of the provisions of the by-law the offenders were leniently dealt with.

The architects have been slow to recognize the provisions of the by-law. They do not submit their plans and specifications for approval, and many of their specifications call for material which is prohibited by the by-law. Venting of taps is often omitted, and some of the plumbers imagined that if they kept up to their specifications they were all right, however wrong the specifications might be. One of the defendants at the Police Court made the plea that although his work was not up to the requirements of the by-law, it was done in accordance with the provisions of his contract with the owner, whereupon the magistrate replied: "Then you made acontract to break the law."

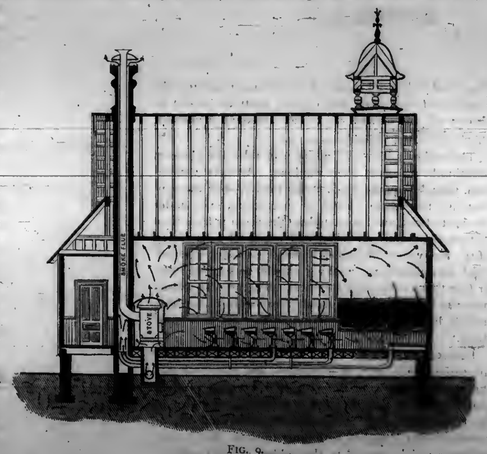


FIG. 9.

This difficulty will be avoided since the city engineer has decided to refuse permits for private drains until the plans and specifications of plumbing and drainage have been filed in his office, and the same approved. This, with the withholding of water supply until the inspector's certificate has been obtained, will ensure a pretty strict conformity to the requirements of the by-law. These are some of the requirements : Ventilation of the drain and soil pipe ; an air inlet just inside the main trap ; soil pipe extended through the roof ; every fixture separately trapped, including rain water pipes when they open near windows ; trap ventilation ; all work to be left uncovered until inspected.

"Defective plumbing" is invariably the verdict rendered on finding any unpleasant odor in the dwelling, and a suspicious look comes over the face of the occupant as he peeps into the waste outlet of the kitchen sink, but he rarely thinks of looking for a defective drain, and they are legion. Wherever I see a tile drain in a house I regard it with suspicion. Fully four-fifths of the sewer gas that gets into dwellings comesfrom faulty drains. They are generally laid by laborers, some of whom may be very careful about their work, but the majority are not to be trusted with such important work. It may be said that a tile drain properly laid is as good as a cast iron one. That is probably true, but it is impossible for any inspector to certify that a tile drain is properly laid without seeing every portion of it being laid. Then after it has been covered with clay it is out of sight, and consequently out of mind. The question arises what should be substituted. The answer is *cast iron*, with the joints properly leaded, and when practicable run on the cellar walls, or suspended from the cellar ceiling, and if is necessary to run under cellar floor, let it be laid in a trench lined with brick, cemented and covered by boards or stone slabs so that it can be inspected at any time, and cleaning screws placed at convenient points for cleaning any stoppage which may occur at any time.

It is a good plan to expose to view all, or as much of the drainage and plumbing system as possible. There s a feeling of security where one can trace all the waste pipes and soil pipes to their connection with the drain, and then follow that up until you see it pass outside the walls of the house.

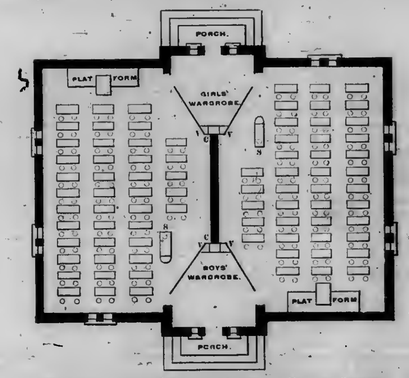
PURIFICATION OF WATER BY ELECTRICITY

THE purifaction of water by electricity is the latest electric discovery. This is said to have been accomplished by two Pittsburgh gentlemen, Prof. Blanck and R. W. Smith. A patent has been applied for and details are for obvious reasons suppressed; but it is claimed that very remarkable results have been achieved; and the destruction of all animal and vegetable life and the entire removal of everything deleterious to health, can be successfully accumplished, resulting in the production of water absolutely pure. It remains to be seen, says the Western Electrician, whether this can be accomplished on a sufficiently economical basis for general use. If so, it will be a great boon, as impure water is a fruitful cause of disease and there is probably very little water in use which is even approximately pure. In the rural districts the water obtained from wells and springs is largely impregnated with mineral impurities, and is surface water filtered through strata of rock and soil, while the unfiltered surface water obtained from brooks and ponds is still more impure. In large cities the sewage is, in many cases a constant menace to the purity of the water, and wells in the vicinity of cemeteries, barnyards, and privy vaults are poisoned fountains.

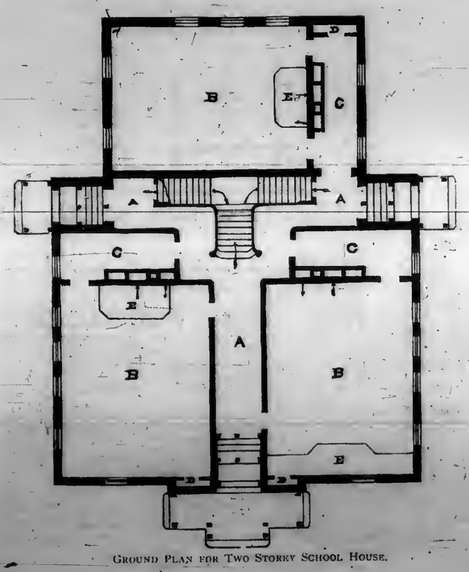
Builders are invited to contribute of their experience to the columns of this paper.

DESIGN FOR A TWO STOREY SCHOOL HOUSE.

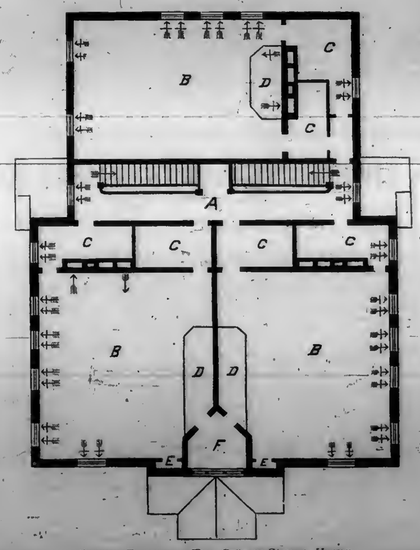
DESIGN FOR A GRADED, RURAL, OR VILLAGE SCHOOL HOUSE.



GROUND PLAN FOR A GRADED, RURAL, OR VILLAGE SCHOOL.



GROUND PLAN FOR TWO STOREY SCHOOL HOUSE.



SECOND FLOOR FOR TWO STOREY SCHOOL HOUSE.

Peterboro' brickmakers are preparing for a big season's sale.

The Calgary Lumber Co. will make bricks at Cochrane this year.

Mr. A. Biot, Montreal, will build a glass works at Ottawa if a bonus is offered him.

Toronto manufacturers will in future make bricks of a uniform size. There will be no advance in price.

Mr. Wm. Davidson, builder and contractor, Mount Forest, Ont., is about to open a planing mill and sash and door factory.

The Buckingham Brick and Tile Co., Montreal, have been incorporated with $30,000 capital stock for the manufacture of brick, drain tile, &c.

Mr. A. S. Walker, talks of starting a brick kiln at Neepawa, Man. Good clay can be procured, and building next year promises to be brisk.

One of the latest uses to which paper has been put is the building of chimneys. It is made in the form of blocks which are joined with silicious cement.

Dealers in Montreal are holding stocks of cement for higher prices. This anticipation of a rise is based on recent advances in prices in foreign markets.

Mr. Walter Beatty, Pembroke, Ont., has refused the offer of a $3000 bonus to assist him in rebuilding his sash and door factory recently destroyed by fire.

For cement to make joints for granite monuments use clean sand, twenty parts; litharge, two parts, quicklime, one part; and linseed oil sufficient to form a thin paste.

Messrs. Jas. H. Donnel and H. C. Stavley have recently purchased the planing mill business formerly conducted by Messrs. Kincard & McWilliams, Peterboro', Ont.

The Bell Telephone Company in Montreal is establishing telephone communication between different departments in large warehouses, thus doing away with speaking tubes.

For veneering for panels, thin stripes of white pine may be stained with bleached and tinted creosote, both wood and creosote being heated. When cold, the surface is to be varnished with shellac. The tones present a translucent appearance.

The pavement in front of the Fifth Avenue residence of the late W. H. Vanderbilt, New York, has one large stone forty feet long and twenty-five feet wide, the largest piece of flagging ever quarried, and alone cost $9,000. The Vanderbilt pavement cost altogether $40,000.

It is said that carbonate of lime found in the vicinity of Shallow Lake, Grey Co., Ont., will produce a good quantity of whiting, and that this, together with the clay of the district, will make excellent Portland cement. A company is being formed for the manufacture of these articles.

In a paper on the strength of different kinds of wood for building purposes, Professor Johnson calls attention to the fact, as now demonstrated, that many cheaper kinds of timber may prove more valuable for structures than more expensive varieties, which have been supposed to be stronger, and, therefore, more desirable. Thus pine supports or pillars have been found stronger than oak ones, when tested in large samples.

E. Van Noorden & Company, of Boston, manufacturers of metallic sky-lights, have contracted with the city of Charleston, S. C., to line the walls of four hospital wards constructed of wood, with glass, one-quarter of an inch thick, set in angle iron frames, held in place by galvanized sheet-iron caps; the ceiling will be of finely corrugated iron, arched to a radius of twenty-four feet. The wards are each 30x112 feet, one story high, with double pitch roofs. The idea in using glass is to prevent the absorption of disease germs and to secure cleanliness. Although glass has been suggested for this purpose, this is the first instance of its use of which we have heard. The people of Charleston are watching the work with interest.

A USE FOR BRICK WASTE.

ACCORDING to the statement of Mr. Miles, a well-known engineer, it is a fact peculiar to Spanish countries that ordinary brick dust, made from hard-burned, finely pulverized bricks, and mixed with common lime and sand, is universally and successfully employed as a substitute for hydraulic cement. Mr. Miles says that during an engineering experience of some six years in Cuba his opportunities were ample for testing its merits, and he found it in all respects superior to the best Rosendale dydraulic cement for culverts, drains, tanks and cisterns, and even for roofs. In an experiment to test the strength of this product, it was found that a block of it, ½-inch in thickness, without sand, and after an immersion in water for four months, bore, without crushing or splitting, a pressure of fifteen pounds per square inch. It is thought that, by the addition of pulverizing mills to brick yards, to utilize the waste and broken bricks, a profitable manufacture might be carried on.

CASTING PLATE GLASS.

THE operation of casting a plate is as follows: The glass in the pots having attained the proper degree of liquidity, and having received a thorough melting and refining, the fire is slackened to render the mass somewhat viscous by cooling. The doors in front of the pots are lifted or taken away; the workmen, each with a long pair of iron pincers, take hold of the pot in the furnace, bring it upon an iron truck or carriage, and at a dog-trot carry it under the crane. The impurities of glass gall upon the surface of the glass are now scraped off and the pot carefully wiped on the outside with a wet cloth to prevent dirt from falling upon the casting table. The pot is now seized by a pair of strong iron tongs or nippers and raised over the table by means of the crane. The casting table is a large cast-iron slab well polished, mounted upon a carriage running over a railway. Upon this table two iron rules of the thickness of the required plate are now laid on each side. The pot suspended above is now tilted over and the glass poured upon the table. A heavy iron roller is now passed over the glass, the ends of which rest upon the thickness rules. During the rolling, if any impurities are detected in the glass while yet plastic, they are removed with suitable instruments. The plate is then annealed, after which it is ground, smoothed and polished, each being an operation requiring time and care.

QUALITY OF BRICKS.

THREE main points with reference to bricks have to be taken into account. 1. The power of resistance under pressure; 2, the appearance of the fracture, which should present an even texture, and a fine and brilliant grain, without cavities in the interior, and neither ribbony nor stony; 3, the exterior, which should be smooth and regular, the angles and edges sharp and straight. When the size of the bricks is equal throughout the mass it is a proof that the brick earth has been well prepared and the bricks generally well made. A brick, when struck, should give forth a clear, ringing sound. Good bricks are generally of a dark reddish-brown color, and sometimes they show vitrified spots on the surface; it is not well however, to depend too much on the last fact, for it is often only an indication of the amount of heat to which the brick has been subjected, while the clay of which the brick is made may be impure and ill prepared. Bad bricks are readily recognized by their reddish-yellow color, but still more by the dull sound which they emit when struck; their grain being soft they crumble easily, and absorb water with avidity. A good brick should not absorb more than about one-fifteenth of its own weight of water; it should appear, and in reality be, dry. A brick that does net take up any water at all is too much burnt; the mortar adheres to it imperfectly, but it is a good conductor of heat. Such bricks may be used in damp soil and for pavements. When a brick left in water either scales or swells it is of bad quality and contains costic lime. A brick which, being made red-hot, and then having water poured on it, does not crack, is of extraordinary and rare quality, and those which have borne the effect of moisture and dryness during two or three winters without scaling or cracking are excellent. In order to try if bricks will bear the effect of frost, let one be boiled for half an hour in a solution of sulphate of soda, saturated cold, and then suspended by a string over the vessel in which it has been boiled. In 24 hours the surface of the brick will be covered with small crystals; the brick is then to be immersed again in the solution until the crystals disappear, and again suspended, repeating this operation for five days, the crystals reforming after each immersion. If after this treatment a number of particles of the brick are found at the bottom of the vessel containing the solution, the bricks are incapable of supporting the effects of frost.—*Carpentry and Building.*

THE MARBLE QUARRIES OF CARRARA.

THE famous marble quarries of Carrara have been worked for centuries, and as yet show no signs of exhaustion. The marbles of this favored locality are among the very few which possess that exquisite fineness of texture, purity of color, and freedom from veins and spots which are demanded for the uses of the sculptor's art: and the major portion of the famous works of ancient and modern art have been chiseled from Carrara stone.

The quarries of Carrara are very extensive, and give employment to 6,000 men; in addition to which there are in the town no less than 100 studios of sculpture and 65 saw mills.

The method of extracting the stone is peculiar. In some of the quarries the men are hoisted to the height of some 900 feet above the level of the quarry, and up aloft on the mountain side excavate and loosen colossal blocks of the precious rock. Each gang (as described by eye-witnesses), or the foreman of the gang, goes down with, and on, the block as it is swung by derrick ropes out into the air and swiftly brought to mother earth. The free, easy primitive style of the Carrara flying trapeze work makes it appear doubly dangerous. The fact that hundreds of accidents happen every year does not appear to have any influence with the workmen.

The condition of these quarrymen and their offspring is described as being pitiable in the extreme. One who writes from personal observations, says of them: "Their food is dry bread, a raw onion and dirty water. It is the only place in Italy where wine is not drunk. Worn out by incessant toil, these people, insufficiently fed, fall into dissipation, violence and crime, dying like dogs and leaving on the white marble the sweat of their wretched lives. We see none of all this under the hand of art.

Fully $800,000 worth of marble goes out annually from these marble quarries, the bulk of it to France. The price of it varies according to its beauty. The first quality is priced at $60 to $80 per square meter at the seaport. This is what we term statuary marble. The second quality is priced at $45 to $62, and the spotted at $30 to $50. Then comes pure white, but not statuary marble; the price is $50 per square meter. The second quality is $35, and the third is $30. The veined quality is $25. Violet-hued marble brings $70 to $100 per square meter. These are the ordinary tariffs, and on them the profits are absurdly high before the marble leaves the quarry. In some instances I have known first-class statuary blocks to be rated at $12,000 each, regardless of market rates."

"I have a little ornamental work I should like to submit," said the Carved Design to the Corinthian Temple. "Thanks," replied the Temple, "but the pressure upon our Columns is so great that we shall have to Decline your Offer."

Tom—"We've got a bay window in our house." Bessie—"So have we. And a balcony." Tom—"Pooh! That's nothing. We have two bath-rooms." Bessie—"So have we." Tom—"We've got something you folks haven't. I heard papa tell mamma about it last night." Bessie—"I'll bet we've get some of 'em too. What is it?" Tom—"A defective flue."

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THOROLD, - - ONTARIO.

OTTAWA, 7th June, 1884.

DEAR SIR,—I duly received your letter of the 1st ultimo, requesting my opinion relative to the Cement manufactured at your establishment in Thorold, in reference to which the following is respectfully submitted: For the past *forty years* the natural Hydraulic Cement obtained at Thorold, Province of Ontario, has been used to my knowledge, on various extensive public works, and in every instance the result has proved highly satisfactory. When properly burned, ground fine, and used fresh from the mill, it will compare favorably with any natural or artificial cement that I know of for building or other purposes in a moist position, or for walls that have been built a few weeks before water has been let in on them. It is well adopted for concrete foundations, walls, drains, cisterns, or indeed, for any hydraulic works; when properly prepared and mixed with two parts of clean sharp sand to one of cement, the result will invariably give good satisfaction.

I am, sir, yours very truly,

JOHN BATTLE, Esq., Cement Manufacturer, etc., Thorold, Ont. JOHN PAGE, Chief Engineer of Canals, Canada.

QUEBEC, MONTREAL, OTTAWA & OCCIDENTAL RAILWAY.
CHIEF ENGINEER'S OFFICE,
MONTREAL, 31st March, 1881.

JOHN BATTLE, Esq., Thorold:

DEAR SIR,—I have tested with Reihle's Testing Machine the tensile strength of six blocks made from the barrel of Thorold Hydraulic Cement which you sent me last summer. The blocks were made of neat cement, and were 1½ inches square at the smallest part. Four of them were kept 23 days in air, and only broke under the following weights: No. 1, 420 lbs.? No. 2, 470 lbs.; No. 3, 436 lbs.; No. 4, 420 lbs.; averaging 437 lbs. each, or 194 lbs. per square inch. The remaining two were kept one day in air and forty-seven in water, and broke under the following weights: No. 5, 470 lbs.; No. 6, 450 lbs.; averaging 435 lbs. each, or 193 lbs. per square inch.

Yours truly, P. A. PETERSON,
Chief Engineer,
Quebec, Montreal, Ottawa & Occidental Railway.

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Toronto.—*Edward Terry, 25 George St.*
" *Robert Carroll, 66 Adelaide St. West.*
" *Joseph Adamson, Esplanade, foot of George St.*
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VOL. I.] The Canadian Architect and Builder. [No. III.

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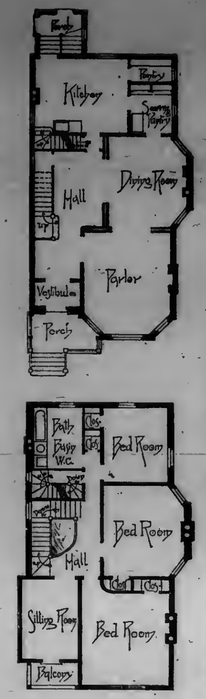

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PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No. IV. **TORONTO, CANADA, APRIL, 1888.** PRICE 20 CENTS $2.00 PER YEAR.

—THE—

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

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C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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ADVERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

THE advertising pages of the CANADIAN ARCHITECT AND BUILDER this month include the names of many reputable firms whose announcements appear for the first time in this number. We commend them and their goods to architects and builders for whose use they are designed.

THE danger arising from the exposure of electric light wires, was illustrated the other day at Welland; where during a thunder storm the electric light wires, highly charged with electricity, set fire to the wood work of a building. The proper place for electric light wires is underground, where doubtless they would be now were it not for the expense connected with placing them there.

IT is a pleasure to learn that it has been decided to replace the unsightly fence which surrounds the Horticultural Gardens in this city by a low iron fence of pleasing design. The high board fence has too long marred the beauty of our residence streets, but there is at last abundant evidence that it will be forced to make way for something more in keeping with nineteenth century progress.

READERS of this journal who may desire to be enlightened regarding any matter connected with their calling about which they may be in doubt, are invited to send their enquiries to this office, and every effort will be made to supply to them the required information. The desire of the publisher is to make this journal a medium of practical information. The answering of difficult questions involves time and trouble. Notwithstanding, we will endeavor to supply the information needed if our readers are sufficiently interested to write us briefly and clearly what they desire to know.

IN the Bill introduced into Parliament to regulate the conduct of railway companies in their relations to the public, it is recommended that the granting of free passes be abolished, excepting members of the Federal or Provincial Government. Wherefore this exception? It is members of Parliament who travel most on free passes, and who can scarcely be expected to champion the rights of the people as against the railways so long as they are the recipients of such favors. If there are to be any exceptions to the rule abolishing free passes, they should not include members of Parliament, whose efforts should be given free handed in the public interest.

THE recent action of the Toronto Trades and Labor Council on the subject of technical education is surprising and amusing. Having heard that it was the intention to establish courses of instruction in carpentry and devote some time to instructing children in the public schools in the use of tools, the Council have appointed a committee to investigate the matter, with "instructions to interview the Board of School Trustees, and suggest to them that the two hours proposed to be devoted to learning the use of carpenters' tools be devoted to the learning of law and medicine." The reason given for this action is that "there are already too many who know how to handle tools, but nothing more," and that what is wanted are schools for technical education. We are surprised that a professedly democratic body like the Trades and Labor Council should object to any attempt to impart to the rising generation technical instruction. We are still more surprised that they should desire to substitute for such instruction, the study of subjects like law and medicine. If a little knowledge of the way to use carpenters' tools is a dangerous thing, how much more dangerous and useless an imperfect knowledge of law or medicine? If there are already too many people who know how to handle tools, are there not vastly too many in the ranks of the lawyers and doctors? It is doubtless true that technical instruction can be imparted more thoroughly in technical schools than in the public schools, but, on the principle that half a loaf of bread is better than none at all, should it not be a matter for satisfaction rather than for objection, that until technical schools shall have been established in Canada, some measure of technical instruction is to be undertaken in the public schools.

THE contractors of Hamilton have locked out all their union men, and seem determined that some solution must be arrived at to settle how far trade unions shall interfere in their personal affairs. The lock-out was brought about through union men refusing to lay stone quarried by non-union labor. If these men do not desire to lay such material, they have the right to drop work if it so pleases them. Likewise the contractors have the right to refuse to employ union men. There is as usual a great cry about the arbitrary conduct of the contractors in locking out men who are not personally directly interested, but who are nevertheless interested as union men. There is nothing said about the tyrannical and harsh methods of the unions which will not allow their members to work alongside non-union men. If a man wishes to exercise his right to act as it may please him, and refuses to join a union, the supposed champions of liberty step in and say: "If you wish to exercise your right to free action and will not join our union, we will see that you and your family are brought as near starvation as possible. We will not allow you to procure work. Wherever there are union men employed, the employers must choose whether they shall employ union men or non-union men, for we will not work alongside of you. You may starve in consequence, but that is nothing to us. We care not for your sufferings so long as we gain our objects." This is practically the attitude of the unions towards employers and non-union men. The contractors of Hamilton have accepted this challenge by discharging all union men and employing such workmen as they may deem fit in their own interests.

The building trade in Toronto has been very much injured by injudicious strikes. There are some eighteen or twenty different trades or divisions employed in the erection of buildings. Any one of these divisions may retard building by striking, and as they generally strike when work is plentiful in their particular line, they seriously interfere with the progress of the season's building. Of late years we have not had many months peace from strikes. Some one or other of these divisions have had grievances which apparently could not be remedied without a strike, and no sooner is one strike over than there is another. Those out on strike are supported by those at work in the other divisions. The parties building are the principal sufferers, and it is almost time that they took some interest in seeing that they are not made to stand the full loss. Contractors can stand the strikes very well now, as a clause in their contracts relieves them of all penalty for delay through strikes. If they suffered as in the past they would long before this have had a remedy. The ratio of wages of all the divisions in the building trades does not fluctuate to any extent, and if such ratio as between the different parties interested were definitely settled, it would be possible to have one grand strike instead of some twenty. We would then have a strike for an advance of five or ten per cent. all round, and all would win or lose together, and not one-tenth of the time would be lost in the settlement of disputes that there is now. It is a matter for surprise that the contractors have not made use of their central organization, and forced this matter to a head. Every time there is a strike they must lose through their plant lying idle, and in many other ways. If they could bring about a settlement of all questions in the building trade by one effort, it would improve matters very much. The first time they have trouble with any of their men, if they would lock out all the men engaged in the building trade and inform them that they would not take them on again until they had arrived at a settlement among themselves as to the ratio of wages, and that in future a strike must be for an advance all round or not at all, they would very soon stop this continual interference with a season's building by some small section of dissatisfied union men. These small strikes have become a most serious nuisance, and must be put down in some manner.

We will attempt to explain what is meant by a ratio of wages. Suppose the wages of a mason is $3 per day; carpenter, $2.50; painter, $2.25; tinsmith, $2; laborer, $1.80, etc. The difference in these amounts remain at about the same ratio, so that if the mason strikes for $3.30 per day and gets it, we are likely to have a strike before long with the carpenters for $2.75, the painters for $2.50, the tinsmiths for $2.20, and the laborers for $2. The advance has been general, and is about ten per cent. all round. Well, what we would like to see would be an agreement as to this ratio of wages, and thus have the fight all along the line for a general advance or reduction. The contractors would not lose nearly so much, and the men would be benefitted by losing much less time, as every strike that we now have throws nine or ten more of the other branches out of employment. The

business interests of the community would not suffer nearly so much, and we would have less destitution during the winter and early spring months. It is possible that if the building trades were consolidated, so that one strike would answer instead of twenty, we would not be troubled with any. The interests would be so great, and the result of a strike of such consequence, that there would be more desire shown to arrive at a settlement before resorting to the last alternative. It would certainly be much easier to bring outside influence to bear in the settlement, and arbitration could more easily be used to secure a quiet and satisfactory adjustment of all disputes.

THE rebuke administered to the Montreal City Council by leading citizens, who turned out with picks and shovels to put the streets in a passable condition, was a cutting one indeed. A great deal of apathy is displayed by the taxpayers in towns and cities regarding the management of civic affairs, yet we are pleased to see that there is a limit beyond which neglect and incompetency will not be tolerated. The streets of Montreal of late would certainly disgrace a city of much less pretentions, and unless an improvement takes place now, the position of the gentlemen composing the Board of Works will be anything but pleasant when election time comes round again.

THE Royal Canadian Academy Exhibition and Art Fair will be held in the Granite Rink, Toronto, in the second week in May. The building, which is very large, being the new northern rink building of the Granite Club, will be divided into two parts. The smaller portion will be used for the exhibition of paintings, sculpture and architectural drawings. The larger portion will be used as an Art Fair and for the purpose of giving scenic representations of art, commencing with the Egyptian period, and coming down through the Grecian, Roman and middle ages to the present time. This will be done by tableaux, accompanied with singing and dancing. Canadian art will be represented by winter and summer scenes of forests, rivers, lakes, water falls, etc., in which will be introduced Indians, tobogganers, skaters, snow shoers and lacrosse players. On alternate evenings will be given representations of old English customs, cheap-jacks, Punch and Judy shows, etc. There will also be stereoscopic views of all the important buildings and statuary in the world. The Art Fair will be held throughout the week. Bric-a-brac, china, beautiful fans, rare laces, etchings, engravings, etc., will be disposed of at stalls representing those in use in the middle ages. There will also be stalls for the sale of flowers, candies, cigars, etc., and which will no doubt be liberally patronized. Refreshments may also be had in rooms specially arranged for the purpose. The musical department has been placed in charge of most capable masters. The exhibition will be opened by Lord and Lady Lansdowne on the evening of the annual assembly, Monday, May 7th. Sir John and Lady Macdonald and many other distinguished persons will be present. It is expected that the Exhibition will be the best so far held. A number of the members of the Academy spent the summer among the Rockies, and we may expect a number of works picturing the grand scenery of those regions. Many valuable works from Great Britain and the United States are expected to be exhibited. We hope that this Exhibition will result in a financial success, and that the benefits from the artistic side may also be very great. There are people who require to be taught that while they themselves may be very deficient in artistic knowledge, there are some living amongst them who, while they are not Michael Angelos', are able to do good artistic work if their clients would but furnish sufficient funds.

THE new plumbing by-law passed by the Toronto City Council at its last meeting is in some respects a loosely constructed ordinance, and the wisdom of some of its provisions is open to question. It cannot be said to be as evident an improvement on the former by-law as persons interested in its provisions had a right to expect. Time is required to perfect a measure of this kind, and perhaps if more time had been given to consideration of some of the clauses of this new by-law, its meaning and the justice of certain of its provisions could be more easily discovered.

A very objectionable feature of the by-law in our opinion, is the refusal of a license to any plumber who is not a Canadian by birth or naturalization. This clause was inserted we understand because some cities in the United States have a provision of that kind in force. This, however, is no reason why such a regulation should be adopted here. If our American neighbors choose to exhibit their narrow-mindedness, that is no reason why we should follow their example. To exclude any man who has the means and the ability from engaging in a legitimate business, is unjust, unworthy of this enlightened age, and detrimental to the progress of the city and country. Why make this discrimination in regard to plumbers? Why not include manufacturers, storekeepers, bakers, butchers and all other lines of business?

The by-law provides that within three days after notification has been given that work is ready for inspection the City Engineer "shall *call for* either the peppermit, water or smoke test, and record the result of such inspection in the City Engineer's office." Who is to make this test? The by-law does not say. Shall the City Engineer "call for" the plumber who does the work to make the test? In that case what guarantee is there that his report will be a correct one? Again, if the plumber is to make the test, he should be told definitely which method of testing will be required, as the difference in the cost of the several kinds of tests varies considerably—the water test, for example, being much more expensive than the peppermint test. This clause is altogether too indefinite.

Another clause which is open to objection is the one compelling the plumber to stamp his name upon every water-cock, bibb, tap, etc., which he connects to the water service. The plumber should not be held responsible for the proper construction of a cock or tap of which he is not the maker. Why not put the responsibility upon the manufacturer, where it belongs? The water works department should do the inspecting and stamping of plumbers' goods, and should charge the manufacturers a fee to cover the cost of the work. This is the system which is in successful operation in Manchester and other large cities, in England and it is certainly preferable to the one embodied in the new Toronto by-law.

In rule 2 of section X it is stated that "no lead, waste or vent pipes shall weigh less than the following," etc. This may be very clear to the framers of this by-law, but we think that if it had been worded "that no waste or vent pipes constructed of lead shall weigh less than the following," it would have been very much clearer to those who will have to interpret it. Just below the above clause is another which states that "air pipes may be constructed of wrought iron pipe, but not of sheet iron." Now, we would like to know what are air pipes? Are they the pipes venting taps, or are they the ventilating pipes from the closet space or from the rooms. Let us have a definition, for we confess we are very much in doubt, notwithstanding we thought we knew something about such matters.

The Examining Board is to consist of the City Engineer, Assistant City Engineer, Superintendent of Water Works, two practical master plumbers to be chosen by the Master Plumbers' Association, one practical plumber to be chosen by the Journeymen Plumbers' Association, and one architect or sanitary engineer practising in Toronto. This Board is unnecessarily large. The work would be better performed by three men whose ability and integrity were above question. The by-law, while making provision for the appointment of all the other examiner, does not say by whom the architect or sanitary engineer shall be appointed. The appointment of the examiners, who, above all others, should be chosen for his knowledge of sanitary science, is thus left to the City Council. Those who know how appointments by the Council are made, will not hesitate to declare that some more satisfactory method should have been provided.

We have neither time nor space this month to go fully into the consideration of all the provisions of the new by-law. We have simply tried to point out a few of its defects. In a future article we may revert to the subject again. In the meantime there is cause for congratulation in the fact that although the by-law is open to improvement in many particulars, the importance of sanitary regulations is apparently receiving a considerable amount of attention at the hands of the aldermen.

A new pneumatic stone dressing machine consists of a gun metal cylinder in which works a loose piston, one end of the cylinder being prolonged into a nozzle in which bits and chisels may be inserted. The stem is pressed onward and receives blows from the piston, which is shot backward by air at a pressure of 40 pounds per square inch, and makes, in the smallest machines, 15,000 strokes per minute. The stones thus treated are much superior to those dressed by hand, the surface being beautifully smooth and even.

THE LINTEL.

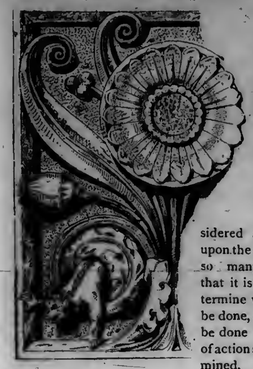
John Ruskin, in discussing the lintel in architecture, says: "The principal distinctions between existing styles of architecture depend on their methods of roofing any space, as a window or door for instance, or a space between pillars—that is to say, that the character of Greek architecture, and of all there is derived from it, depend upon its roofing a space with a single stone laid from side to side; the character of Roman architecture, and of all derived from it, depends on its roofing spaces with round arches; and the character of the Gothic architecture depends on its roofing spaces with pointed arches or gables. I need not, of course, in any way follow out for you the mode in which the Greek system of architecture is derived from the horizontal lintel; but I ought perhaps to explain that by Roman architecture I do not mean that spurious condition of temple form which was nothing more than a luscious imitation of the Greek, but I mean that architecture in which the Roman spirit truly manifested itself, the magnificent vaultings of the aqueduct and the bath, and the colossal heaping of the rough stones in the arches of the amphitheatre; an architecture full of expression, of gigantic power and strength of will, and from which are directly derived all our most impressive early-buildings, called, as you know, by various antiquaries, Saxon, Norman, or Romanesque. Now, the first point I wish to insist upon is that the Greek system, considered merely as a piece of construction, is weak and barbarous compared with the two others. For instance, in the case of a large window or door, if you have at your disposal a single large and long stone you may indeed roof it in the Greek manner, as you have done here, with comparative security; but it is always expensive to obtain and to raise to their place stones of this large size, and in many places nearly impossible to obtain them at all, and if you have not such stones, and still insist upon roofing the space in the Greek way—that is to say, upon having a square window, you must do it by a miserable feeble adjustment of bricks. You are all aware of course, that this latter is the usual way in which such windows are now built in England; you are fortunate enough here in the north to be able to obtain shingle stones, and this circumstance alone gives a considerable degree of grandeur to your buildings. But in all cases, and however built you cannot but see in a moment that this cross-bar is weak and imperfect. It may be strong enough for all immediate intents and purposes, but it is not so strong as it might be; however well the house is built, it will not stand so long as if it had been better constructed, and there is hardly a day passes but you may see some rent or flaw in bad buildings of this kind."

MORTAR.

Lime or cement paste, says C. H. Haswell, is the cementing substance in mortar and its proportion should be determined by the rule that the volume of the cementing substance should be somewhat in excess of the volume of voids or spaces in the sand or coarse material to be united, the excess being added to meet imperfect manipulation of the mass. Hydraulic mortar, if re-pulverized and formed into a paste after having once set, immediately loses a great portion of its hydraulicity, and descends to the level of the moderate hydraulic limes. A great destruction of the hydraulic principle, therefore, results from any disturbance of the molecular arrangement of the mortar after crystallization has commenced. This is what occurs with the intermediate limes, which take mitial set promptly and firmly, but which are subsequently thrown down by the slaking of the impure caustic lime which they contain. All mortars are much improved by being worked or manipulated, and as rich limes gain somewhat by exposure to the air, it is advisable to work mortar in large quantities, and then render it fit for use by a second manipulation. White lime will take a larger proportion of sand than brown lime. The use of salt water in the composition of mortar injures the adhesion of it. When a small quantity of water is mixed with slaked lime a stiff paste is made, upon becoming dry or hard has but very little tenacity; but, by being mixed with sand or like substances, it acquires the properties of a cement or mortar. The proportion of saud that can be incorporated with mortar depends partly upon the degree of fineness of the sand itself, and partly upon the character of the lime. For the rich limes the resistance is increased if the sand be in proportions varying from 50 to 140 per centum of the paste in volnme; beyond this proportion the resistance decreases. Stone mortar—325 pounds cement, 120 lime and 24.67 cubic feet of sand. Brick mortar—326 pounds cement 120 pounds lime and 12 cubic feet of sand. Brown mortar—Lime one part, sand two and a small quantity of hair.

CANADIAN ARCHITECTS.

By "Onlooker."



PANEL DESIGN.

THAT the profession of architecture in Canada requires to be raised to a higher level all will admit. How it may be done is not a question to be readily solved. The men who are now considered architects look upon the profession from so many standpoints, that it is difficult to determine what is best to be done, or how it should be done if once the line of action should be determined. From the men who are architects because they love their profession and take delight in their work, little need be feared. They will immediately do all in their power to help along any movement which will raise the profession which they love to a higher sphere. But from the men who only practice as a means of gaining a subsistence, little can be expected except the improvement will return them a good dividend. There are men who lie between these extremes who are perfectly indifferent either way. They will assist if it does not require too much exertion on their part or take up time which could be employed in the earning of a small increase to their present income; otherwise they are passive.

A short description of the different classes of men who are now practising as architects in Canada, would not be out of place. There is first the man of aesthetic temperament—all his inclinations are to the strictly artistic side of the profession. Problems in construction, or the methods of carrying out the work, and matters of detail, either as to money or the many other questions involved, are to him exceedingly irksome. Secondly, we have the man whose inclinations are decidedly artistic, but not to the complete shutting out of the many practical questions that must be solved. Thirdly, the man whose inclinations are more mathematical, whose delight is to solve difficult questions in construction or planning, and who is able to acquire a correct knowledge of the artistic portion of his work. Fourthly, those men whose inclinations are to the mathematical side of all questions, and whoare unable to acquire correct artistic knowledge—in fact, men who should have been engineers. From men having all these various qualifications we have everything to hope. They, one and all, have been drawn into the profession through preference for some portion of the work, and where men have entered the profession which they follow on account of natural qualfication, they can be depended on to work in its interest. Besides these men, there is another class which cannot very well be divided into divisions, although divisions really do exist. Many of these men have become architects as they would have become almost anything else they might have drifted into—and which, if the current had been in another direction, would have made of them lawyers, brokers, estate agents, bookkeepers, or anything else. A living had to be made, and they came to the conclusinn it might as well be made making plans. The amount of work did not seem great, and it was rather a nice, genteel sort of way to make a livelihood. Their success very seldom lies in their ability to do good work, but often in their doubtful methods. Their object is to gain money, and so long as they obtain what they most want they are not over particular how they get it. Some men become architects through following some one of the building trades. They have had more than usual intelligence, or ambition, or conceit, and have entered on a more ambitious plane. From these men little help can be obtained towards elevating the position of the profession.

There is one thing of which we may be assured, and that is that there cannot be much hope until the great majority of the members are educated men. An architect cannot have too good an education, and the more liberal it has been the better for the man. It is a prevalent idea that any man of intelligence, provided he has practical knowledge of the simplest building construction, can be a successful architect. Successful he may be from the point of getting work, but not in the higher degree of doing good work. It is difficult to determine what constitutes success in architecture in this country. The people have such little knowledge of what is good, that they are unable to distinguish between good and bad. The majority will decide that the work is good if it has cost a sufficiently large amount of money to impress them with its costliness, or if the work is sufficiently large to impress them with its size. A small, plain building of faultless design will be passed unnoticed by those who will go into ecstasies of delight over a building impressive by its size and costliness of material, and yet devoid of the slightest artistic feeling, in fact, a building the embodiment of all that is vulgar and hideous to the cultivated mind. If the public are to be educated up to a love of true art, it should be done by men who have received a thorough training, and whose very nature has become imbued with love of the artistic. We cannot have an artistic people if the men to whom they look as teachers are themselves ignorant and uncultured. The architect of the future must have as liberal an education for a foundation to commence the work of his life upon as the member of any other profession. He is to follow a profession which is the equal of any, and requires the highest culture obtainable of its members if they are to be truly successful.

How can this higher education of architects be brought about? It may be assisted by judicious judgment on the part of architects now practising in the selection of pupils. If an architect discovers that the pupil who has offered himself is deficient in education, he should be rejected. He should also be rejected if he is intending to enter the architectural profession in much the same manner as he might enter another pursuit, and without any natural ability or partiality for it, more than of earning a living in a decent sort of way. The young man who chooses architecture believing he will not require to work hard, will be very much disappointed, for there is no profession which requires so much patient study and hard work from its members. By careful attention to the selection of proper pupils on the part of those who are now architects, the architects of the future may become a much superior body of men, taken as a body, to those now practising.

THE ARCHITECTURAL GUILD.

THE Architectural Guild held its usual monthly dinner on Thursday evening, April 12th. After dinner the members adjourned to the public library, where a very pleasant evening was spent looking over the many valuable architectural works. Mr. Bain, with his usual thoughtfulness and desire to bring before the public the benefits of such an institution, had made careful preparations for the entertainment of his visitors. The principal attraction was the work on the Basilica of St. Mark's at Venice. It consists of several large portfolios of large colored plates and twelve volumes of smaller plates. The Toronto Public Library is to be congratulated on the acquisition of this most valuable work. We understand that duty had to be paid on it, which seems to us a most short-sighted policy on the part of the Federal Government. While the Governments of other countries value art and technical education so highly that they tax the people that they may be able to give them this education, our Government tax our people to prevent them acquiring it. To our way of thinking it is most disgraceful that there should be levied on works of art, or in fact, on anything which will tend to educate our people, a direct tax which can be of no earthly service, except to increase the revenue of the country, but which does most seriously interfere with its advancement along lines which are of the greatest importance to our people. We must believe that duty has been placed on works of art, etc., through a lack of knowledge of the consequences. It could never have been imposed with the hope that by placing duty on the Basilica of St. Mark's they might be manufactured by some of our enterprising manufacturers of sewing, reaping or mowing machines. We hope to learn that this duty has been removed from all works which will educate our people to a higher appreciation of art. The members of the Guild were surprised beyond measure at the number and value of the works on architectural and kindred subjects. Mr. Bain must have worked most energetically, and have been loyally supported by the Library Board, to have been able to acquire so many rare and valuable works on art. We will not at the present time attempt to give a list of those works, but hope to be able before long to do so, along with a short description of the subjects on which they treat. It was nearly eleven o'clock when the last of the visitors departed well satisfied with the pleasure and profit of the evening. Many of the members of the Guild signified their intention to avail themselves of the opportunities which the library has placed within their reach for study.

OUR ILLUSTRATIONS.

GATE LODGES AT "GLEN EDYTH."

THIS double lodge was erected in 1884 for S. Nordheimer, Esq., at the Davenport Road entrance to his beautiful grounds. The perspective sketches show the north and south views towards the grounds and road respectively. The driveway passes through between the two houses with the gate itself (which is a simple wrought iron one), in the middle under cover. Each lodge provides accommodation for one of the married men servants and his family. The room over the gateway is accessible from both houses, and can be allotted to one or the other as occasion may require. The ground storey walls are of white brick on a stone foundation, and the upper storey is half timbered and plastered. The roof is shingled. White brick was preferred to red in order to harmonize with the mansion itself. The total cost was under $3,100. The architect was Mr. David B. Dick.

VILLA DESIGN.

The villa shown on another page was designed by Edward A. Kent, Architect, and has been erected on the lake shore near Bay View, Buffalo, N. Y., for Mr. Carleton Sprague. The house is 34 by 72 feet in dimensions, has two stories and basement, and contains seventeen rooms. The outer material of the wall is shingle, which has been stained to give the house an ancient appearance. A great hall, 20 by 30 feet in size, is a noble feature of the interior, which, indeed, in every respect, is what a country house should be. The total cost was $3,500.

REREDOS ST. PETER'S CHURCH, COBOURG, ONT.—LECTERN TRINITY COLLEGE CHAPEL, PORT HOPE, ONT.—DARLING & CURRY, ARCHITECTS.

DESIGN FOR CITY SCHOOL HOUSE.

A movement is on foot among the architects in the United States to increase architects fees from 5 to 7 per cent. on residence work.

On the evening of Tuesday, the 24th inst., a paper will be read before the Toronto Architectural Draughtsmen's Association on "Construction of Roofs."

The new Roman Catholic church at Belleville, Ont., which will be dedicated during the summer, will be a magnificent building when completed. It is built of limestone, the walls being supported by massive red granite pillars, with richly carved sandstone caps.

The Archaeological Committee of the Historical and Scientific Society have requested the Winnipeg City Council to take steps to preserve the old stone gateway which is the sole remnant of Fort Garry. The City Council has promised to deal with the matter at an early day.

We have received from the publisher, architect Frank S. Smith, 22 School St., Boston, an interesting book entitled "Homes of To-day, or Modern Examples of Moderate Cost Houses." The work is illustrated with designs of buildings, accompanied by a list of materials to be used in their construction and estimates of cost.

THE CALCULATION OF BRICK-WORK.

ORDINARY bricks are about 8 inches in length, and with the mortar joint, about half that in width, so that each brick on the flat will give a horizontal surface of about 32 square inches or 4½ bricks will cover a square foot. All ordinary laid, says the *Engineering and Building Record*, there are 9 courses to every 24 inches, or 4½ to the foot. Four and a half courses with 4½ bricks to the course gives 20¼ bricks to the cubic foot. Waste, cutting, and closer joints will easily require an allowance of 12 bricks per cubic foot, which will be found a very convenient figure for estimating the number of bricks required for a wall of a given size and thickness, as it thus becomes unnecessary to find the cubic contents of the wall, but merely to multiply its face area or the product of its length and hight in feet by seven-fourths of its thickness in inches, which, as the thickness is always some multiple of four inches, is a very simple process.

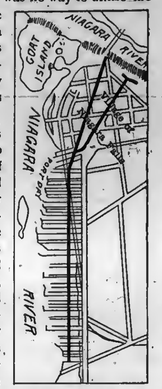
For instance a 20-inch wall 40 feet long by 30 feet high has a face area of 1,200 square feet, and as it is 5 times 4 inches in thickness it will require 5 times 7, or 35 bricks per square foot of face, 42,000 bricks altogether.

Messrs. Rhodes, Curry & Co., Amherst, N. S., are filling an order for Newfoundland for cherry and ash doors, and one from London, Eng., for a lot of mahogany doors.

Architects, Engineers, Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost, name of owner, etc.—of any works of construction in progress.

NIAGARA RIVER POWER.

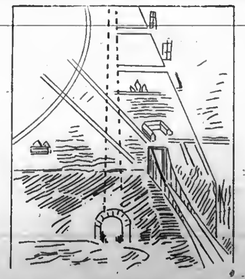
ALL lovers of the sublime and beautiful in nature have rejoiced that the State of New York at last took control of Niagara Falls, laid out a reservation including and preserving the adjacent beauty, and to some extent regulating the cost of a visit to the great waterfall. At the same time, all who have seriously thought of the immense water-power there literally "running to waste" have had their utilitarian instincts grieved by the confident statement that there was no way to utilize the force without marring the beauty. How to make Niagara useful without making it less beautiful has been the question; and it is now confidently announced that the problem is solved.



Niagara, say the engineers can be made to yield 119,000 horse power and not a foot of the reservation be encroached upon any building erected near the falls. Mr. Thomas Evershed, Division Engineer of the New York State Canals, has presented the perfect plan and estimates; Mr. Elnathan Sweet, New York State Engineer and Surveyor, has cordially approved them, and a company has been formed to carry them into execution. This company proposes to furnish 500 horse power each to 238 mills, which shall be located from one mile to two and a half miles up the river from the falls in no way interfering with the view, yet easily accessible by the river and railroad, and all this they propose to accomplish by one great tunnel underneath the town and side tunnels from the river, each with its wheel pit for turbine water-wheels—the whole series drawing through the main tunnel to the level of the river below the falls. Thus they will secure, at a cost of $3,000,000 or less, a power exceeding the combined water power of Holyoke, Lowell, Minneapolis, Cohoes, Lewiston, and Lawrence and unlike theirs, subject to no vicissitudes of drouth or danger of overflow or destruction of dams, but from sources exhaustless as the great lakes and in tunnels as enduring as the solid rock.

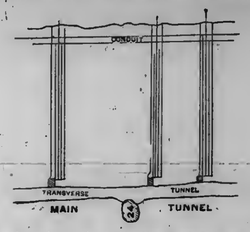
The conception is sublime. The complete work would seem to undo any of the wonders of the ancient world. It exalts one's views of the dignity of the human intellect. Yet the plan is so simple that the most ignorant can comprehend it.

The conditions are these: From the head of the rapids to the cataracts the fall is sixty-five feet, height of cataract 165 feet, total fall 230 feet. The average flow



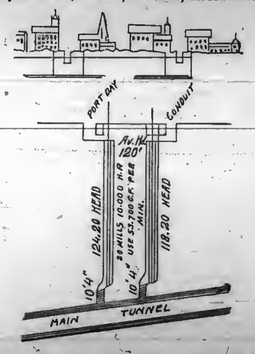
of the river is 275,000 cubic feet per second; total water power, therefore, 7,000,000 horse power, from which the company proposes to take only 190,000 horse power. At the foot of the falls the river turns almost square to the right; thus a straight line from the rapids to the edge of the water just below them is the hypothenuse of a right-angled triangle. The tunnel, therefore, is to begin at a point just above high water level, but 200 feet below the top of the bluff, below the falls; thence it is to run at an up-grade of one foot in 100 through the solid rock to a point a mile above the falls; thence it is to continue one and a half miles parallel with the river, 400 feet distant from it and 100 feet below it, and to be connected with it by lateral tunnels. Of these each is to have its wheel-pit for turbine water-wheel, and the slope of the lateral tunnel or conduit such as to secure a rapid discharge of the water. The main tunnel is to be twenty-four feet in diameter, amply sufficient to discharge all water the side tunnels may pour into it; and these with heads ranging from twenty-four to eighty feet, for turbine wheels of the latest pattern, will amply secure the promised 119,000 horse power, or, 500 horse power each for the 238 factories, for which sites can be provided in the space secured.

It is proposed to lay out the mill sites of sizes from 75x200 to 200x400 feet; to leave ample space between



for railroad tracks to the main line and for streets; to build wharves and secure landings for lake and canal vessels, and secure ample rail connections with the railroads centering at the falls. And finally the company propose a charge of but $10 per year for each horse power of water supplied—less than a third of the average cost at other places—yet when all the sites are utilized the income will be 40 per cent. on the total cost. These are the immediate returns looked for; but beyond lie vast possibilities of storing and transporting the power by electricity to neighboring cities.

Considering the fact that the available water power of the country is diminishing as the forests are cleared, and that in many manufacturing centers summer drouth and winter floods are serious menaces, one can but wonder that the exhaustless power of Niagara has not already been utilized. Manufacturers would hardly ask us to credit them with sentimental reasons for withholding their hands. No doubt the principle obstacle has been the enormous initial cost of making the improvements, as it presented itself to most who examined the subject. No one company could profitably utilize such a power; and it was not easy to form a sufficient combination of companies. The fact that Niagara is on the Canada frontier had something to do with it no doubt; and still more, that it was on the western frontier when the factories of New England and Eastern New York were established. Some small raceways were made several years ago, involving not 1,000 horse power in all; but they all come within the fixed bounds of the park reserved by the state, and are, of course, discontinued. In



1855 the hydraulic canal was begun, outside the limits of the reservation—that is, across the peninsula on which the village of Niagara Falls is built, and after a long disuse it was reopened in 1878, and now supplies power to a few manufacturers. Since July 4, 1879, a Brush dynamo, supplied with power by the rapids, has been run in Prospect Park for the illumination of the falls and grounds, and other small uses have been made of the power. But all appear trifling compared with the plan proposed by the new company.

Another scheme for the utilization of Niagara's power has been set on foot by certain gentlemen of Lockport, N. Y. Their purpose is to supply water for the city of Tonawanda and vicinity, for manufacturing and other purposes, by taking it from the Niagara river at Tonawanda, or some point between Tonawanda and Niagara Falls, and discharging the current into Lake Ontario near the village of Olcott. The watchwords of this organization are taking. They are: Lake Erie, the mill-pond. Niagara river, the head-race. Lake Ontario the tail-race. No floods. No drouths. No broken dams. No idle mills.

The land at Tonawanda is but little higher than the river. From there northward is a gradual rise for about ten miles to a ridge running in an east and west direction, Lockport being situated on the ridge, whose crest there is lower than farther west, and is cut by two ravines or depressions. The work will be all cutting, and little or no embankment will be required. From Lockport to the mouth of Eighteen Mile Creek the country falls and the distance is comparatively trifling.

The Niagara river has a fall of 333 feet. It is proposed to run a canal from a point opposite Grand Island, near Tonawanda, where the current is not rapid, to Lockport, discharging the water which shall pass through it into Eighteen Mile Creek, which empties into Lake Ontario and will form a conduit for about one-third of the distance. The utilization of the power is first practicable at Lockport. Between Lockport and the lake twenty dams are practicable, at each of which the full power of the water of the canal with a considerable head can be effective. Of course the size of the canal and the fall obtained will determine the amount of power that can be made available. It is claimed that 363,636 horse power can be obtained at Lockport, where a 220 feet fall can be had if the canal be twenty feet deep and 200 feet wide.—*Chicago Tribune.*

MONTREAL TECHNICAL SCHOOLS.

By D. J. Cameron.

TO all who feel interested in the material progress and national advancement of our own country it is satisfactory to know that the Council of Arts and Manufactures of the Province of Quebec, is making steady forward steps in the direction of art industrial education. The establishment of free evening drawing classes in the Province of Quebec for instruction of a practical nature has already attained marked beneficial results, and a visit to the schools whilst in session, promptly dispels the notion which many people entertain, that drawing is a merely ornamental study, for there is no mechanical industry requiring construction which does not to some extent employ the principle of drawing, and in these evening classes which are conducted by competent practical teachers, the pupils are not only instructed in the principles and methods of construction, but are required to develop their conclusions in a practical manner with their own hands. The stair builder, after having made his plans, proceeds to lay off his material, and develops his reasoning faculties by erecting from his own plans the actual stairs.

THE SCHOOLS.—

There are eleven distinct classes in the Montreal evening school, each class meeting twice a week from 7.30 to 9.30 p.m. By kind permission of Mr. S. C. Stevenson, the Secretary of the Council of Arts, the writer was permitted to inspect each class at work.

The first class visited was the

FREEHAND DRAWING (ELEMENTARY)

conducted by Mr. Frank S. Cleverly, assisted by Mr. E. Bregent. This class has an average attendance of 98 pupils, two-thirds having daily employment as engineers, architects' pupils, carpenters, engine fitters, mechanical draughtsmen, etc., and the remainder are attending day school. The method of construction pursued in this class is similar to that recommended by the South Kensington School of Art. Junior pupils having no idea of drawing, are first given two points on their drawing paper, between which points they are taught to make a straight line. When this task—to the beginner a difficult one—is mastered, they are taught to draw a gate, a box, or some other simple subject. From straight to curved lines is the next step, and the pupil is given some outline object, such as tea cup and saucer, to work upon, and by graduated studies he is trained to a proper knowledge of form and proportion, and in this manner is prepared for the higher classes. The pupils being in all stages of advancement, a hard task is imposed upon the two teachers to give proper attention to each of the ninety-eight. This class should be divided, and one formed for boys attending school, and the other for young men in mechanical pursuits or offices during the day.

FREEHAND DRAWING (ADVANCED.)

This class is conducted by Mr. A. Boissean, A. R. C. A. It is intended for pupils more advanced than those attending the former class, being more comprehensive. It includes applied designs and drawing from the human figure or ornament. The majority of the pupils are engaged in industrial pursuits.

MECHANICAL DRAWING.

The teachers in this department are Mr. J. S. Gardham and Mr. S. C. Wilkinson. The instruction is of a very practical nature and is designed chiefly for mechanics. The ages of the members range from 14 to 35, and the occupations represented are: mechanics, 44; pattern makers, 8; moulders, 3; brass finishers, 2; plumbers, 2; tinsmiths, 2; engineers, 1; clerks, 1; students, 3. The fact of these pupils working for the most part, ten hours during the day and coming from all parts of the city to devote two hours to study, shows an ardent desire for advancement. Having provided themselves with necessary tools and materials, the pupils are first instructed in their proper use, and then proceed to do

copy work of the simplest nature both in pencil and in ink. Having become a fair copyist, the pupil is given a sketch of some detailed piece of machinery, with dimensions, or a wooden model. The different views of the piece represented he is required to "lay down to scale and finish up" according to workshop practice.

ARCHITECTURAL DRAWING.

This class is under the direction of Mr. J. E. Vanier, C.E., and Mr. E. Belanger, and is intended for carpenters, builders and cabinet makers. The instruction consists of exercises in plane geometry and projection, and the pupils are also instructed in the details of framing plans and elevations of buildings and of working drawings. The majority of pupils are engaged as carpenters, cabinet makers and tinsmiths, and as the use of tin for cornices and architectural decoration is of late entering so largely into building and construction, the opportunity for knowledge in this direction is duly appreciated.

MODELLING AND WOOD CARVING.

This class was formed for the instruction of marble and stone cutters, wood carvers, and for all whose occupations require a knowledge of the chisel. The necessary tools are provided free, and although the number of pupils in attendance is not large, the work that they have completed bears evidence of their industry and application. Plaster casts are chiefly used as models, the pupils commencing with simple forms and proceeding by degrees to more difficult subjects. The benches and lights are very conveniently arranged, and every facility is provided for the convenience of those at work.

LITHOGRAPHIC CLASS.

The object of this class is to afford apprentices and workmen engaged in lithographic establishments an opportunity to study and practice work, which they are not enabled to do in the places where they are regularly employed. The course of construction commences with the preparation of the lithographic stone, and proceeds by regular steps until the pupil is able to finish a drawing on the stone with pen, pencil or brush, ready for the press, thus gaining a knowledge of the whole process from the "graining" of the stone to the production of finished copies from the press. This class is attended by 18 pupils, who, under the able teaching of Mr. J. Labelle, have produced a number of creditable studies.

PLUMBING CLASS.

This class is open only to plumbers' apprentices and those employed in plumbers' and steam fitting establishments. The workshop is fitted with benches, melting pots, tool chests and all necessary appliances to accommodate thirty-two working pupils. These places are all filled, and there were many applicants who could not be admitted for want of room. The instruction is given under the immediate direction of the Master Plumbers' Association, and consists of a course of practical work on seams, overcast joints, cup joints, traps, horizontal or upright wipe joints and branch joints, wiping on a stop-cock, wiping a flange and wiping on a ferrule. Short lectures or "shop talks" follow each evening's work, on the subjects of "Soil Pipes," "Trapping and Ventilation," "Supply Pipes," "Boilers." "Solder and Mixtures," "Tanks," "Fixtures," "Common Mistakes in Plumbing," and other subjects of useful knowledge to every plumber. It is most pleasing to notice the close attention of the young workers, who are kept at one subject until they have thoroughly mastered it, and they exhibit with evident pride the results of their study and practice. The progress in this class is highly satisfactory both to the pupils and their masters, and the interest the latter are taking in the class is an example which employers in other industries would do well to follow.

DECORATIVE PAINTING.

This class is taught by Mr. F. E. Meloche. Pupils before entering must have a good knowledge of drawing. The object of this class is to assist those who wish to have a thorough knowledge of decorative painting according to the rules of art.

PLASTER WORK AND SCAGLIOLA.

Mr. R. Rogers is the teacher of the above subjects. This most interesting class was instituted for the purpose of teaching plasterers, house decorators and others, the higher grades of plaster cornice work, casing, ornaments, etc., and for the instruction of pupils in the art of making scagliola. Scagliola is a species of coloured plaster or stucco made in imitation of marble, the manufacture of which is not commonly known in Canada. Scagliola is quite equal to marble for inside decoration, and is produced at a fraction of the cost of the latter.

The last class organized, but by no means the least in importance, is the

PATTERN MAKING CLASS FOR BOOT AND SHOE MAKERS,

under the direction of Mr. Joseph Godin. The course of lessons is intended for shoemakers generally, and particularly for those who wish to have instruction in the study and practice of pattern cutting as applied to the manufacture of boots and shoes. The studies are of a very practical character, the pupils first making, reducing and enlarging patterns of all kinds, and afterwards fitting them to the cast.

CANADIAN SOCIETY CIVIL ENGINEERS.

A PAPER on two bridges over the River Ottawa at Vaudreuil and St. Anne's Locks was read at the meeting on the 5th inst., by Mr. C. E. Dodwell. At the meeting on the 19th inst., a paper on "Cedar Block Carriage Ways" will be read by Mr. Alan Macdougall.

The contractors of St. Thomas, Ont., have granted the request of the Carpenters and Joiners Union, that nine hours be considered a day's work on Saturday, and that the men be given the last hour of that day.

The Toronto Master Plasterers' Association has elected the following officers: President, F. B. Lockwood; treasurer, John Boyce; financial secretary, J. W. Kennedy; secretary, John Knox; delegates to the Toronto Builders' and Contractors' Association, F. B. Lockwood, R. Dancy, J. W. Hynes, J. W. Kennedy and George Rudlen.

APPRENTICESHIP.

AT the recent convention of the National Association Cincinatti, a special committee appointed to consider of Builders of the United States held recently at the question of apprenticeship presented the following valuable report:

Your committee, in whose charge was left that important question known as the apprenticeship system, have thoroughly revised past methods in their relation to past conditions; have visited manual training schools existing as adjuncts to school of technology, or as departments of the public school system; have inspected the celebrated mechanical trade schools, established and maintained in the city of New York by the philanthropy and liberality of Col. Richard T. Auchmuty; have had the privilege of a lengthy interview with the generous founder, and make the following report:

We find that the old system of apprenticeship, under which the boy who wished to learn a trade was "indentured," or "bound out" to an employer for a term of years, has been gradually falling into disuse from natural causes, until scarcely a vestige of it remains.

In our opinion there is no encouragement for a revival of this old system, for the following reasons:

Fifty, and perhaps even twenty-five years ago, the employer in the building trades worked with his own hands, and being continually present, could give proper instruction to the apprentice. He took the boy to board in his own house, and to a certain extent had an oversight of his habits, and could control his general conduct to the end that a good mechanic should be the result.

The situation to-day is widely different. Employers seldom work at the trade, for the reason that there is a great increase in the volume of business, and because new and quicker methods of work have become so desirable and necessary that the time of the employer is fully occupied in attending to business details and in general direction; he seldom or never takes tools into his own hands or remains long enough upon actual work to instruct in that practical way which was possible formerly.

The apprentice is left, therefore, largely in the charge of the workmen. Foreman or other employes give such general instruction as may result from their good nature, or sense of duty to the boy or to their employer.

It is a fact which cannot be disputed that there is at present no such thing as regular or systematic teaching the apprentice being left to "pick up" his trade instead of having it taught to him.

We are strongly of the opinion that the tendency of modern methods of conducting work will always be away from those general conditions which made possible the "old apprenticeship system;" and this opinion, together with the fact that under broader opportunities for education there is, undoubtedly, a much higher grade of intelligence to-day than in the past, and the fact also that trades are subdivided much more than formerly, so that greater proficiency is required in the various branches, leads us to the conclusion that apprentices must be taught and mechanics made, in the future, by entirely different methods from those in vogue under the system referred to.

These new methods may be briefly described as a combination of schooling pure and simple, and practice pure and simple; or, in other words, of a course of schooling under regular instructors (the schooling to be paid for the same as any technical course is paid for in other professions) and a course of practice, under employers, on natural work, which practice or service shall receive appropriate wages.

These two courses will form a comprehensive and complete system, which, when fully understood and thoroughly operated, will produce a better class of mechanics than the present no-system, or the past hap-hazard system, and will leave as little to chance as possible.

The first step will be the establishment of mechanical trade schools, whose definite purpose shall be to give preparatory instruction in the science or technique of trades to young men who intend to follow mechanical pursuits for a livelihood, this preparation to be supplemented and followed, and the education completed by a term of service on practical work under actual employers, which term shall be of shorter duration than usual on account of and by virtue of the preparatory course in the trade school.

While we admit that "Elementary Manual Instruction" as already introduced to some extent in the public schools, is valuable to the ordinary scholar (inasmuch as it may cultivate a certain amount of manual dexterity and create a taste for mechanical pursuits), we are still strongly of the opinion that for the practical training of young men who intend to be mechanics, special instruction must be had in mechanical trade schools as an intermediate course between the public school and that actual service with the employer where his education will be completed and from which he may graduate as a journeyman.

We believe that these practical mechanical trade schools should *not* be a part of the public school system, but should be established and maintained by private enterprise.

We also believe that these schools should not be established or maintained exclusively by any distinct association of builders, but are emphatically of the opinion that such associations should cooperate with them, and indeed that such cooperation is necessary to insure their success as the first stage in the education of the mechanic, as well as to establish the fact that builders recognize the school as part and parcel of the new system.

The legitimate and proper method of cooperation in this system, as far as associations of builders is concerned, should be by encouraging private enterprise to establish these schools; offering to assist pecuniarily until they become self-supporting; agreeing to give preference of employment to graduates from the schools; joining in the management by appointing committees to approve methods, and examine students in establishing their proficiency, which shall entitle them to certificates of graduation.

We are convinced that there is abundance of capital that will quickly be invested in enterprises of this kind as soon as associations of builders demonstrate a belief in their practical value by lending aid in the way suggested.

We recommend that the National Association of Builders approve of the following detailed method to take the place of the old apprenticeship system and secure its approval and adoption by all filial associations as rapidly as possible, to the end that mechanics may be taught upon our own soil and American boys given the best opportunity possible to become proficient in the building trades.

Method approved by the National Association of Builders to establish the right of any person to be known as a regular journeyman in the building trades.

1. The serving of a regular course of instruction in a mechanical trade school and graduating therefrom with a certificate of proficiency granted by the same, under rules and regulations approved by a committee of master mechanics, who may unite in the management of the said school.

2. Service for a term of practice with an employer on actual work, this term to be at least one year less than the usual term of apprenticeship by virtue of the holding of a certificate of proficiency granted by a mechanical trade school. During this term of service the young man to be known as a "junior."

3. The completion of the education of the mechanic to be acknowledged on the part of the employer by the issuance of a certificate from the association of builders to which the employer may belong, which shall state that the holder has passed through the prescribed course at the trade school, and the term of practice with an employer (name and location given) with satisfaction and credit, and is entitled to be received by all builders as a journeyman.

LONDON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE contracts for the new medical school have been let as follows:—Carpentry, J. C. Dodd & Son: brick work, Jas. Luney; painting, A. Corp.

The contract for stands and fencing for the base ball grounds has been awarded to Messrs. Fawbling & Jones.

The architects held out for some time against signing the revised contract conditions, but finally yielded.

James Johnston, brick merchant, is building a double house to cost $5,000.

Wm. Thornton is going to build a double house to cost about $3,500.

Plans are prepared for a sanitarium to be built at the foot of Dundas Street three storeys and basement with large swimming pond attached, the probable cost of which will be $35,000 or $40,000.

MONTREAL.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

NOW that the last of the frost is disappearing, the building boom is getting well under way. The winter coverings are being removed from the foundations of the New York Life building, and the derricks are placed ready for work.

Messrs. William Davis & Son have completed the derrick station for the new C. P. R. Depot, and the bricklayers are already at work. Fifty stone cutters are engaged preparing the way for the masons, who commence work on the 12th.

The brick work of the G. T. R. depot is completed, and the handsome roof is nearly finished.

The large stone building recently occupied by Gustave Fabre, which was destroyed by fire, will be replaced by two fine stores at a cost of $25,000.

The Imperial Fire Insurance Co. have let the contract for their building—Mason work, Peter Lyall; carpenter work, Simpson & Peel; iron work, H. R. Ives; steam heating and plumbing, R. Mitchell & Co.

OTTAWA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THERE is an unusually large amount of building to be done in Ottawa this year, and already operations have been commenced on many buildings of importance. It is expected that the departmental buildings on Wellington street, will be completed this year, and the new printing bureau for the Government has been commenced and will be pushed forward rapidly. The Bank Note Co.'s building has been carried on during the winter months, but the undue haste is likely to delay matters, as two of the walls have shown signs of weakness, and have taken to themselves somewhat grotesque shapes. Tenders have already been taken for a number of residences, three school buildings, a large stock of stores, and a few alterations to existing buildings. The builders are at work with the Y. M. C. A. block, and architects and builders are looking forward to a brisk summer. A considerable amount of interest has been taken in the decision of the City Council to appoint a Building Inspector. It is generally felt that the appointment of such an official is absolutely necessary.

A WORD OF ENCOURAGEMENT.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—You have made such a noble start as a pioneer in the path of Canadian architectural journalism, that with this third and best number before me, as one of the profession, I feel that I cannot do less than offer a word of praise and encouragement until enabled to give some more substantial assistance.

I am especially pleased that the extracts from Mr. Simpson's paper have been given a wider circulation than by its first reading, and trust that not only draughtsmen but mechanics generally have become subscribers and benefitted accordingly.

I will add to Mr. Simpson's hints that as well as furring beams, &c., the studding at stairs and other openings in floors should be continuous from storey to storey with no joists or other horizontal timbers between to shrink and settle, and wherever possible partitions should stand on beams, walls or partition beads below joists rather than on top of joists and floors.

In studding also the interoal angles should be returned solid, allowing no lath to run behind and through to other rooms. This can be done by a strip of inch board or the strapping at brick walls, and will prevent a crack in plaster.

For the height of handrailing I would suggest say 2 feet 10 in. perpendicular above centre of step and on landing, as more constant than measuring from nosing.

To avoid warping, which is so great a disadvantage in oak door sills, window subsills, steps, saddle boards, casings, etc., the heart side of the board or plank should be dressed or exposed. This is not by many mechanics known or understood, and the sap side is generally dressed because more free from knots, &c.

I am sorry to believe that less interest is taken in these and other self-improving studies by mechanics than formerly, and would earnestly recommend such methods of getting higher pay as far preferable to those apparently now taught by the unions.

The present employers have been workmen themselves, and now by care and industry, occupy improved positions which strikes and boycotts would never have given them.

With sincere wishes for the success of your undertaking,

I am, yours,

M. B. AYLESWORTH.

The Canadian Government is contemplating the construction of a pier, fog alarm and lighthouse in the River St. Lawrence at Lower Traverse. The cost of the proposed work will be $100,000.

Mr. Manson Campbell, Chatham, Ont., has let the contract for his new residence as follows: Robertson & McKee, for the woodwork; Jas. Oldershaw, masonry; Judson, painting; Watt & Son, plumbing. The cost will be about $5,000.

MECHANICS AND APPRENTICES.

THE use of machinery for every purpose which it can be made available seems to have resulted in the lowering of the standard of workmanship among mechanics. When nearly all work was done by hand mechanics were most efficient men, careful to do their work properly, and taking a deep interest in its being kept in perfect condition. They learned their trades thoroughly and were too proud of their skill to slight their work. There were many incompetent and indifferent men, no doubt, but they found their level, and if not capable of doing good work, were given what did not require any high degree of skill. The great majority of the men were first-class workmen, and it was possible to get a man to finish a piece of work as it should be done without having to closely superintend its construction. These men were the result of an apprenticeship system which made a man a good mechanic if he had the natural qualifications. He was instructed in all the elementary principles of his trade, and was not allowed to attempt work requiring great skill until he had mastered what was less difficult. It may have been a hard system, but it was a thorough one, and produced mechanics worthy of the name—mechanics that we would be only too thankful to have at the present time.

There are many good workmen among our mechanics, but it is astonishing how few there are who can do first-class work. If there is anything to be made requiring average skill, it can only be entrusted to certain men, and if they are employed on other work it must wait until they are disengaged. We have become a race of specialists, so that even mechanics are proficient in but one or two branches of their trade. We have men who work only in hard wood, and those who work only in pine. There are those who are shop hands, and those who do the rough work about buildings. Many bricklayers are always employed on face work, others never lay a brick except in rough or inside walls. Employers of labor have found it necessary to keep certain men at one class of work, for if given work they were not accustomed to, they could not earn their salt. It is not possible for every man to be a first-class all round mechanic, but there is no reason why he should not be able to do any work in his trade in a reasonably good manner. There are men to-day who claim to be carpenters who cannot saw the end off a board true and square; bricklayers who cannot lay a brick level and true to the line, and stonemasons who have no conception of how stone should be laid in a wall. All these men claim to be good mechanics, and yet not one of them can do a decent piece of work, and all alike have great contempt for theory, and will affirm over and over that books are worthless, and that what they call practical knowledge is sufficient, in fact, much better, if not adulterated with a theoretical training. They would be nearer right if they were but fine representatives of what a thorough practical training can do for an intelligent man. What most astonishes an onlooker in the ordinary mechanic, is his entire indifference to becoming a first-class workman. If he receives journeymen's wages he is satisfied, and apparently better pleased working at what requires little skill and less brain, than to be employed on that which require both to a large extent.

Once he becomes what is now called a journeymen and can earn the wages of an average mechanic, all necessity for improvement vanishes. He has gained his goal and is satisfied, although he may often be informed in terms none too kind of his lack of skill and general incompetency. It is exceedingly refreshing to meet a man who is enthusiastic over his work; in him you will find a good mechanic. Why have we so few enthusiastic and consequently first-class workmen? Is it that the good workman does not meet with the reward that he deserves, and discovering that he is not appreciated, determines on being no better than the most indifferent man in his trade? He certainly has just cause of complaint that many employers of labor would rather pay low wages to indifferent men who spoil more work than the difference in wages amounts to twice over, than pay capable men good wages. The general public are also much too desirous of paying the lowest wages to a man irrespective of his capabilities. They want good work, but only at the price of bad, and consequently do not get what they profess to want, nor even value for their money. But there is another and possibly a greater influence which checks the ambitions of the young mechanic, and that is the tendency of trade unions to insist on all men, good and bad, being paid the same wages. It is true that they allow the employer to pay higher wages if he so chooses, but as he does not so choose and could not if he would, the capable man suffers, and before long has become as indifferent a mechanic as his natural ambition will allow. That some employers do not make any great difference in the wages paid their men, is the fault of the men themselves. If a workman is working more rapidly than his fellows he is very soon informed that it will not do. He is cutting out a pace which they cannot follow, and therefore he must work at a slower speed to suit the slowest man. An employer cannot be expected to pay higher wages to a man who can earn more than he is receiving, but who is not allowed to do so by his companions. What thanks does an employer get for increasing the wages of a first-class man beyond those of the average mechanic? The man so favoured, instead of thanking his employer and his good fortune and keeping the fact to himself, immediately informs some of his friends, or boasts of the fact to others. All the men hear of it, and to a certainty the employer is besieged by almost all his employees for a like increase, and the men who give the most trouble are the most inferior in his employ. His best men will not be one half so ready to demand an increase of wages as the man whose only first-class qualification is his incompetency. Two men may work equally hard for nine hours a day, and yet one may do 30 per cent. more work in the same time. The employer can see the difference, but the slow man cannot be convinced of the fact.

Every man should receive remuneration in proportion to his worth, and that can never be under the present system. Instead of driving a man down to a lower level he should be assisted to a higher. A uniform rate of wages furnishes no inducement to development, and while a man may for a time struggle to acquire skill and knowledge through love of self-improvement, he will soon tire in the race and become indifferent. If the trade unions would only turn themselves to the work that lies before them and strive intelligently to improve the position of the workman by encouraging him to become a thorough and capable mechanic and refuse to class among their number the careless, ignorant and lazy, they would do a work which would benefit not only themselves, but the whole community. Instead of preventing young men learning trades, they should afford them every opportunity and take every care to see that they learned the trade of their choice most thoroughly. The sons of mechanics cannot all become professional men; must they therefore become laborers, vagrants or thieves? Who is better entitled to the privilege of learning a trade than the son of the mechanic? And yet, in these days, by the order of irresponsible bodies, this privilege and right is most seriously interfered with. We are glad to see that a movement to solve this question of apprenticeship has been made by the National Association of Builders of the United States. The Legislative Committee on apprenticeship made a report, printed elsewhere in this paper, at the annual convention held at Cincinnati. The Committee advised that young men desirous of learning a trade should attend a trade school, graduate with a certificate of proficiency, and then serve a term at actual work to obtain manual skill in his trade—the completion of the apprenticeship to be acknowledged by a certificate stating his qualifications, and which is to be received by employers as a voucher of his right to be considered a journeyman.

The above is not by any means a solution of the question, but it is a long step in advance. No great question has been solved at one effort, it has taken long and slow stages to arrive at a final solution. When arrived at the result may seem a very simple one and the method of solution very easy, but yet it may have required the thought and effort of many able and conscientious men for a long period to overcome the many obstacles. It is hoped that now an attempt has been made to solve this most difficult question of apprenticeship, it will receive the thoughtful attention of all interested parties.

PLASTERING.

By James Wright.

THE following valuable hints formed the substance of an interesting address on the above subject, by Mr. James Wright, of this city, before the Architectural Draughtsmen's Association last month:

Laths.—Laths should be only one inch wide for ceilings and one and a half inches wide for walls and partitions. The joints should be broken every 12 laths; a larger joint than this is likely to cause a crack in the plaster through the expansion of joist. The laths should be well nailed uniformly three-eighths of an inch apart. Green are better than dry laths in all cases, but particularly when no artificial heat is used, as there is no expansion; dry laths expand, then contract, generally cutting the key. Laths having the bark adhering to them and black supply laths should always be discarded as they will certainly discolor the work, but as this class of laths is supposed to be only in No. 2 quality, No. 1 should always be used. In exterior work laths should never be employed, as they sometimes are, as a substitute for strapping. The strapping should be at least one inch thick, otherwise the key will be broken through the expansion of the boarding.

Sand.—Architects' specifications usually call for "clean, sharp sand." Sharp sand may not always make the best mortar. On Carlton street and that vicinity, in this city, there is a sharp sand which has not the quality of consuming a proper proportion of lime to make good mortar. It is what plasterers call "too fat." One fifth more of this sand than that of Bloor street could be used with the same quantity of lime. Soft and loam sands will not consume as much lime as the lake sands. Sand that contains small particles of clay should never be used. A good test of sand is to take a handful and work it well in the clean hand, if it leaves a deposit of color on the skin it contains clay or decomposed sand. A mortar has been made in England from crushed bricks and clay, and used with success in large cotton factories, where the machinery causes a continual jar. It sets very hard with lime, a hammer having to be used to remove it. Sea sand cannot be used for plastering, as the salt which it contains causes dampness.

Hair.—Hair should be long and dry, beaten with rods and separated properly, and not, as is usually done, soaked in a barrel and then thrown in the pit. In England the hair is not mixed with the lime until the latter has stood for about three weeks; this is not necessary in this country where the limes slake quickly.

Mortar.—All reliable firms keep a mortar man, who from his experience is skillful in the art of slaking limes, and on him depends the class of mortar used in a building—provided he is given the best materials. The mode of slaking the lime and mixing the hair and sand is so well known that it need not be repeated.

Plastering.—In two coat plastering it is simply impossible to make the angles "straight, plumb and square," as usually called for in the specifications, unless the studding and strapping is plumb and square. Architects should always specify plastering to be done in three coat work to ensure a first-class job—the extra cost is only 3 to 4 cents per yard. A proper key is obtained for the first, or scratch coat, and all expansion or contraction is avoided, as only enough mortar is put on the laths to form a bond for the next coat, or what is called the "browning" or "straightening" coat. This coat should not be carried up to the ceiling where a cornice is to be run. In the preparation of putty for finishing, great care should be taken in slaking the lime, so that it does not burn or "dry slake." It should be completely covered with water in a box prepared for that purpose. After it is properly slaked it is mixed to a proper consistency, then run through a fine sieve into a pit. All putty should stand at least two weeks before being used. If used before that time it is likely to blister. A blister is caused by the lime not being properly slaked, small particles going through the slaking process after the lime has been used. The scratch coat not being covered to the depth or projection of the cornice, forms a key to retain it; that is if the cornice is not very heavy. If very heavy, nails should be driven in where there are joists, and where there are no joists the key should be cleaned out at intervals, and the gauged mortar pressed into it. Mortar is called gauged when plaster of paris is added to it. In heavy cornices the core is generally composed of hair, mortar and plaster of paris. For first-class work, at least one third of the core should be plaster of paris. The mitres have to be worked in by hand with mitreing tools, no mould having been devised as yet that will run the cornice into the angles. The short returns or breaks are generally planted in, having been previously run and cut on a board. The running of cornices and mouldings of pannelled ceiling, arches, &c., requires the judgment and skill of the best plasterers, to whose knowledge of plastering should be added an acquaintance with the mouldings of the various styles and classic orders and some knowledge of practical geometry. In finishing walls which are required to be done in a first-class manner, it is usual to finish one wall at a time, one wall being worked from top to bottom before proceeding with the other. The ordinary way on two coat work is to finish the ceiling and upper part of the walls first, then, after the scaffolding is removed, the lower part is finished. By the latter method it is very difficult to trowel down level the joining of the upper and lower parts of the wall, the upper part becoming hard and dry so quickly.

The material used in finishing walls is a mixture of lime, putty and about one-sixth plaster of paris gauged together. Water applied with a brush is freely used in polishing or "trowelling up," as it is called. After the finish is set and properly trowelled up, it is brushed over with water and finally with the dry brush to give it a fine polish.

Ornamental Plaster Work.—All centres should be put up to the lath—that is the mortar should be removed within a few inches of the circumference of the centre and the key of the lath entirely cleaned out; the centre should be properly scored and soaked in water if dry. Very little lime putty, nearly all plaster of paris, should be used in this work. If these precautions are taken a centre should remain in position as long as the joists. In putting up enrichments a little glue size added to the plaster prevents it from setting too quickly, allows more time for cleaning off the ornaments, and in the end, sets a great deal harder. When the use of wire is necessary for fixing bosses or large centres, copper or galvanized wire should always be used in preference to wire that would become rusted, as a collapse of work of this description might be a serious affair. A great deal of harm has been done this branch of the plastering trade through centres falling down. An architect or inspector should therefore be particularly watchful regarding the security of these ornaments.

Patching.—In patching, the loose, broken edge should be removed, the dry plaster edge thoroughly dampened and secured with all plaster of paris, making the edge firm. When this is not done, the old work springs from the new patch, and leaves a crack. A patch in plaster work, if properly done, should be, and can be done so as to leave the wall or ceiling as good as it was originally. This, however, is the exception, not the rule.

Meaford, Ont., is providing additional school accommodation

Some of the contracts for the new Orange Hall at Ottawa have been awarded.

The contract for the new Lutheran church at Bridgeport, Ont., has been let.

Mr. J. McLean, Windsor, Ont., has prepared plans for a new police station.

The contract for the new Episcopal church at New Hamburg, Ont., has been let.

There will be more building done in Whitby, Ont., this season than for some years past.

The Bowmanville, Ont., School Board has decided to build a twelve room building on the old site.

The contract for the erection of the new Temperance Hall at Sarnia, Ont., has been let to R. S. Oliver.

The school debenture by-law for the issuing of debentures for building a school house at Banff was carried by 25 to nil.

Do not construct solid doors of two kinds of hardwood—the action of the atmosphere on one or the other will cause the door to warp.

The new hotel at Peterboro, Ont., erected by Mr. Harry Winch, is almost ready for opening. When completed it will cost $15,000.

The Hamilton Board of Education have decided that the $100,000 required for building purposes should be raised by debentures at once.

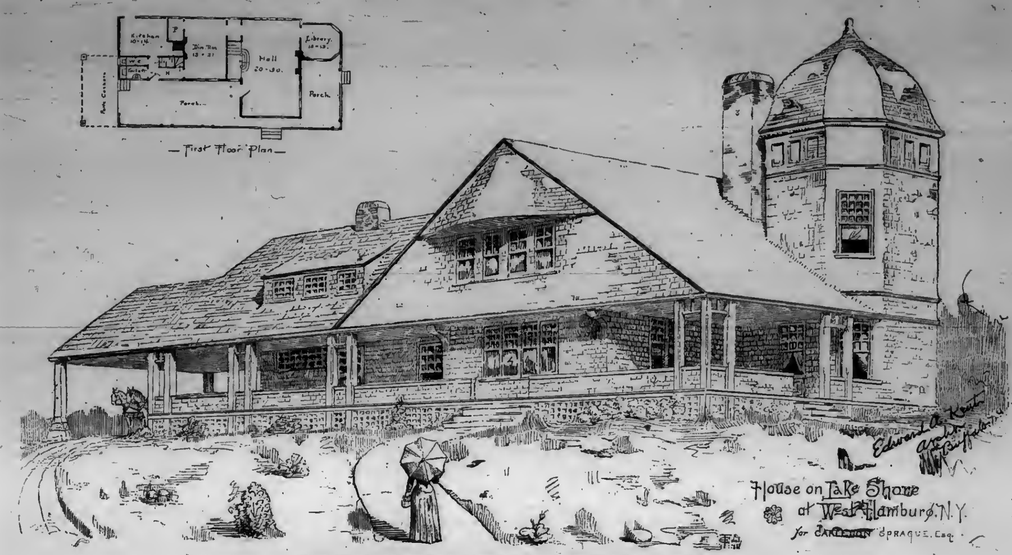
The Canada Southern Railway Company are asking for an Act authorizing the continuation of a tunnel for railway purposes under the River St Clair.

The manse in connection with the First Congregational Church, Kingston, Ont., will be brick two stories high, and heated with water. The cost will be about $6,000.

The Engineering Society of the School of Practical Science, Toronto, has elected the following officers for the coming year:—President, H. E. T. Haultain (acclamation); Vice-President, T. K. Rosebrugh (acclamation); Secretary-Treasurer, John Eamen; Corresponding Secretary, F. X. Mill; Third Year Representative, T. Wickett; Second Year, C. E. Peterson.

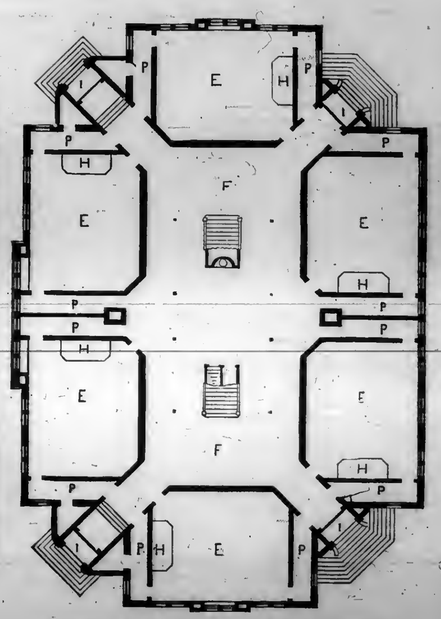
The Building Committee of the new Methodist church at Kirkton, Ont., have accepted the tenders of the following contractors: Evans & Heman, Exeter, for the mason, brick work and plastering; J. Dinnon, of Lumley, for the carpentering and tinsmithing; G. L. Money, of Kirkton, for the painting, glazing and decorating.

As a means of deafening floors General Loyre proposes instead of loading the floors with a sheet of plastering, to fill in the space between the floor-boarding and the plastering of the room below with shavings, which are first to be rendered incombustible by dipping them in a tub of rather thick whitewash. It is well-known that soft substances enclosing air-spaces, form the most efficient deafening, and shavings treated in this way are so incombustible as to add considerably to the fire-resisting quality of the building in which they are used. In cases where it is desirable to disinfect the space between floor and ceiling, the shavings may be saturated with chloride of zinc, or zinc, or zinc chloride may be added to the lime wash.



DESIGN FOR VILLA COSTING $3,500.

DESIGN FOR CITY SCHOOL HOUSE.



Ground Plan for City School House.

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

WIARTON, ONT.—A Town Hall will be built this year.

AURORA, ONT.—The Mechanics' Institute will be enlarged.

COLUMBUS, ONT.—The Methodists will erect a new church.

BEAVERTON, ONT.—The G. T. R. will build a new station house.

NORTH BAY, ONT.—Another new hotel is to be erected to cost $3,000.

WOODSTOCK, ONT.—$2,000 will be spent in High School extension.

MORETOWN, ONT.—A new Methodist church will probably be built here.

MOUNT ALBERT, ONT.—An Episcopal church will be erected this summer.

GEORGETOWN, ONT.—Four acres have been purchased as a site for a new High School.

MILVERTON, ONT.—Mr. Peter Kock will erect a large brick block to cost about $6,000.

SHELBURNE, ONT.—The Methodists propose erecting a $5,000 brick church the coming summer.

LISTOWEL, ONT.—The Grand Trunk Railway Co. are being urged to erect a new passenger station here.

ST. GEORGE.—Mr. R. C. John Dunn, of St. John N. B., is preparing plans for a new school house at this place.

BERLIN, ONT.—The congregation of St. Paul's Lutheran church will probably put up a new church this summer.

MOOSE JAW, N. W. T.—The School Board are selecting a site for a new school house, which they expect to build this year.

TORONTO.—The Separate School Board will erect a two-storey frame building in St. Marks Parish, the cost not to exceed $1,000.

BRACEBRIDGE, ONT.—Mr. Crother is preparing plans for a brick church to be erected by th Bracebridge Methodists to cost about $4,000.

ST. STEPHEN, N. B.—Messrs. Stewart & Co. manufacturers of candy, etc., will erect a new building on the site of their recently destroyed works.

LINOSAY, ONT.—A new post office and customs building will be erected this spring; also a new Collegiate Institute, and a large passenger station.

GALT, ONT.—The Town Council has been requested to submit a by-law to the citizens authorzing the expenditure of $10,000 for the erection of an hospital.

BRANTFORD, ONT.—Among other buildings to be erected in Brantford this summer are the Courtland works and the new shops of Messrs. Harris, Son & Co.

STRATFORD, ONT.—Mr. Fred W. White, Government Engineer, has been inspecting the drill shed, and recommends about $15,000 worth of improvements in the building.

MITCHELL, ONT.—Architect J. R. Kilburn, of Stratford, Ont., is making plans for a palatial residence for Mayor McClay, to be erected the coming summer. It will cost $10,000 or upwards.

LONDON, ONT.—The Salvation Army will erect a barracks and training school to cost upwards of $12,000.—The London School Board will ask the City Council for a grant of $18,000 for school extension.

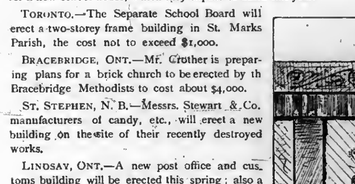
WINNIPEG, MAN.—The necessity of erecting a maternity hospital is being urged upon the Board of Directors of the Winnipeg General Hospital, and it is probable the work will shortly be undertaken.

CROSS HILL, ONT.—The Presbyterians will build a new brick church.—The Township Council propose making alterations in their hall.—The Episcopalians are going to make alterations in their church.

ST. THOMAS, ONT.—Mr. John Noble has offered a lot to the Mayor as a site for a city hospital, provided the city accept the offer recently made by a wealthy citizen to donate $10,000 as an endowment fund.

ST. CATHARINES, ONT.—McLloy Bros, purpose erecting a new bair cloth factory on the site of the old paint mill.—The R. C. church will be extensively enlarged.—Captain Larkin's residence will be enlarged and improved.—An engine house for the Niagara Central railroad will be built, and also a station for the road on Welland Avenue.

KINGSTON, ONT.—The contracts for the remodelling of the First Methodist Church have not been awarded. There is a difference of $700 in the figures of the tenders.—The congregation of St. James Church, who had decided to expend $8,000 in enlarging and beautifying their building, have abandoned the scheme, as it was found the improvements would cost between $9,500 and $10,000. A committee has been appointed to solicit further subscriptions and there is a prospect of a new church being built to cost between $12,000 and $15,000.—The Building Committee of St. Andrews church, recently destroyed by fire, expect to secure $10,000 from the insurance companies, which, with the $8,000 already promised, is sufficient to guarantee a church to cost $25,000 or $30,000. Messrs. Gordon & Helliwell, architects, of Toronto have been consulted about the plans.

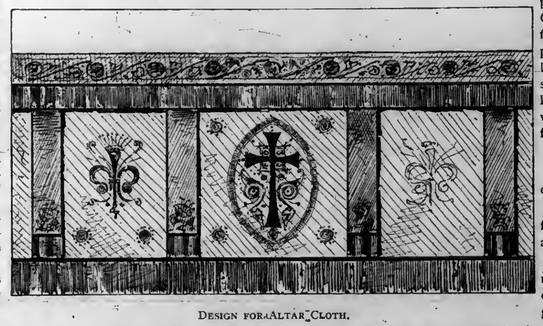


PAINTING.

MR. R. J. HOVENDEN, of this city delivered a most interesting address on the above subject a fortnight ago before the members of the Architectural Draughtsmen's Association, of this city. A synopsis of his remarks is herewith presented :—

In house painting the priming or first coat of color is the foundation for the subsequent coats of color, and on the quality of the materials used in this priming coat, depends in a great measure the stability of the work when finished. All woodwork specified to be painted, after having been cleaned, dusted, etc., and the knots killed by the usual application of shellac knotting, should be primed with (what you invariable specify, but do not get in most cases) "best white lead" and "linseed oil." In this case, no matter what the shade of the finishing color may be, it is always desirable to use raw linseed oil, using either "patent dryer," "sugar-of-lead" or "litharge," as a dryer. It will be found that the color dries hard, even if a little slow in the winter time, and there is no danger of its cracking, honey-combing or peeling off, or, if used outside, blistering under the sun's rays.

After the priming coat has become thoroughlo hard and dry, all nail holes and imperfections in the woodwork are stopped and faced up, and this also should be done with a putty that will harden sufficiently to resist the action of the sand-paper and brush when rubbing



DESIGN FOR ALTAR CLOTH.

down and painting, and not leave the nail holes looking as though they were only half stopped, which, unfortunately, is too often the appearance presented when the work is finished.

The second and third coats of color should be composed of the same class of materials as the first, with the addition of the requisite quantity of turpentine added to each coat. Wood finished in this manner will wear well, and will not crack, honeycomb or blister, but remain as a monument to the credit of both architect and painter.

I have avoided recommending the use of boiled linseed oil in mixing color or brown Japan as a dryer, from the fact that nineteen out of every twenty barrels of boiled oil is what is known in the trade as "bung hole" boiled oil, viz, so many gallons of raw oil is taken out of a barrel, and a corresponding number of gallons of a cheap liquid dryer its put back in is stead; the barrel is then bunged up and rolled around, and you have your boiled oil complete. The average brown japans are very little better as to quality, being made from a very small quantity of cheap varnish gum and a very large quantity of resin, (or North Carolina gum), with a little shellac. The use, therefore, of either, or both, in painting wood work inside or outside is somewhat dangerous, and when used the work is certain to crack, honeycomb and blister. Of such work there are thousands of specimens to be met with in this city to-day.

Another mode of procedure to be avoided, is that of priming woodwork with a color composed of all the odds and ends of a paint shop. It is usually "fat," and will not dry hard, no matter what pains are taken to make it do so, and the result is, in all classes where used, cracks, blisters, &c.

It is always well to give the stairway wall of the several stories a different decorative treatment; also to introduce horizontal lines, as giving greater breadth and stability of appearance.

SELECTION AND APPLICATION OF WALL PAPER.

IT is to be assumed that most persons when selecting a wall paper take into account the mode in which it will be affected by, and that which it will affect, colors of furniture, hangings, carpet and paintings, if these are to be introduced. Most praiseworthy efforts are made by our leading manfacturers, who spend princely sums each year on new patterns, to afford the widest possible range of choice. Nor do the pattern designers proceed arbitrarily. The tendency of taste and fashion in wall papers is as closely watched as those of dress goods, upholstery coverings and carpets, by manufacturers concerned in these lines, in which a constant exchange of ideas is going on, a textile pattern, for instance, often fructifying, in a modified form, on a wall paper. The wallpaper pattern maker, though individually inconspicuous, has risen to high importance in the art world, contributing in attractive productions to intellectual pleasure and social enjoyment. The happiest diversion in favor of wall paper has been the exchange of a narrow band at the junction of wall with ceiling for a deep frieze which allows for the play of inventive design, and the establishment of effective contrasts in form and color. It occupies the same relation to the pattern of the main portion of a wall that a lambrequin holds to a curtain, lessens monotony with enhancement of the general effect.

There is one point in the selection of light-tinted wall papers not to be overlooked. These, when in place on a wall, assume an intenser hue than when submitted to the inspection of the purchaser, owing to the surface of one wall reflecting itself on another, particularly under artificial light. It is best to choose light papers on a sunshiny day; with dark colors this is not so important. but these in their turn, are deepened in hue by reflection, The tints of light paper should always be sufficiently pronounced to be easily distinguished. Gold, where used in arabesque, scroll or floriated designs, should present itself, if part of the pattern on ground, only in fine lines or occasional splashes, for the eye soon wearies of too much unrelieved brilliancy. Gold is best dispensed with in the wallpaper of dining-rooms. where we look for warm rather than bright effects.

Sugar-of-lead is a very satisfactory dryer for white color and varnisb.

Orange tints are useful in many cases for interior decoration, as they are warm and pleasant.

A suitable color for recesses holding marble statuary is cerulean blue; whilst one of the best backgrounds for gold and green bronze is Indian red.

Before proceeding minutely to sketch a colored design, determine the color and relative proportions to be admitted. Remember that elaboration is not necessarily beauty.

Naples yellow, of which the lightest hues are the best, should not be worked with a steel palette knife, or mingled with ochres, prussian blue, or other colors of which iron is the base, as these darken it. Colors blended from lead or antimony suit it.

A varied tone, productive of an extremely good effect, may be given to a stencil pattern by working the brush afterwards slightly over portions, and introducing delicate gradations of tints, varying the manipulation throughout, so as to prevent formal repetition.

In viewing a facade of a house nothing is more pleasing than the sight of statuettes or of statuary groups at the windows. These are occasionally introduced in marble, composition, terra-cotta or bisque, but are not as frequeotly seen as they should be. Flowers and curtains may decorate a window, but statuary completes the decorations.

A pretty, healthful and economical finish for ceilings and walls is made of pulverized soapstone. It can be readily washed, takes a high polish, is pearl-gray in tint, presents the best possible surface for painting, either in oil or water color, and will neither crack nor chip.

For the aspect of friezes in bold relief and the various mouldings of a room, much depends on the position of the jets of flame. If the light comes from wall brackets, the masses of the ornament are apt to be shown with chiaroscuro effects of light and shade rather than in separate details, and the same with table lights. Some people are pleased with one, some with the other effect, but in determining beforehand the position of lights in a room this should be taken into account. The chandelier will afford an equable general diffusion of light, but this is not always desirable.

AN ECONOMICAL METHOD OF HEATING AND VENTILATING.

THE following valuable paper on the above subject was recently read before the American Society of Mechanical Engineers, by Mr. Henry J. Snell, of Philadelphia.

Various methods have been devised and are in use for heating large rooms, manufactories and public buildings. Some of them take into consideration the ventilation of the buildings as well.

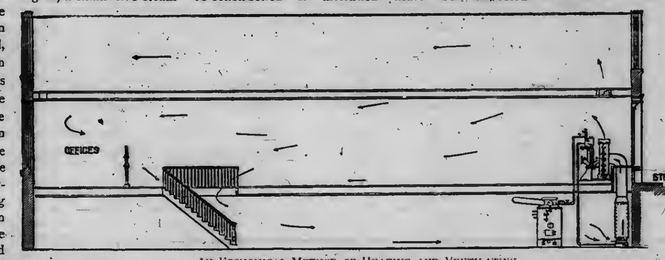
I will describe briefly a method I have had in use in my store at 135 North Third street, Philadelphia, Pa., for the past two winters, which has been very satisfactory. It has been very economical, and dependence could be placed upon its efficiency at all times, no matter what the condition of the weather might be.

A reference to the accompanying sketch will clearly give a correct understanding of the arrangement.

An exhaust fan driven direct by a small upright engine is connected with a "patent air-heater" placed in the basement at the front of the store by an 18-inch galvanized pipe.

An upright boiler in the basement furnishes steam to run the engine; the exhaust steam from the engine is delivered through the exhaust pipe into the base of the air-heater on one side, and the drip and condensed steam is conveyed away through a pipe at the other.

The exhaust steam of the engine furnishes all the heat usually used, but as a precaution, and for use early in the morning, in extremely cold weather, or for use in very moderate weather, in the middle of the day, when it is unnecessary to run the engine, a small live steam pipe is connected with the base of the heater. The fan runs at a very low speed, and is perfectly noiseless. In my case, no conducting pipes for the distribution of the air are necessary, and the variations of temperature in different parts of the store are not observable with the ordinary commercial thermometer. By examining the sketch, it will be seen the store itself becomes one large conducting tube—and the air is used over and over again, enough fresh air coming in through openings around the windows and through doors constantly being opened. An opening near the bottom of the heater has been provided, and three-fourths of the wall surface of the back end is composed of glass; the rest of brick.



AN ECONOMICAL METHOD OF HEATING AND VENTILATING.

The building is five stories and basement, and I only occupy and heat the first and second stories and basement, but I think I could easily heat the whole with my apparatus at a very little increase of cost in fuel.

The engine that drives the fan is three inches in diameter, and has three inches stroke. The wheel in the fan is 36 inches diameter, and 13¾ inches wide at the outlet of wheel; the area of discharge of blower 1.76 square feet and the inlet is same size. The heater is about three feet wide, 6 feet 6 inches high and 20 feet deep, and filled with 588 feet of one-inch steam pipe. I am so well satisfied with the results I get from this apparatus that I have not made any close and accurate experiments of what I can do with it. I know from the cost of my fuel that the expense of heating all I occupy is about the same as I formerly paid when I only heated the offices which were partitioned from floor to ceiling and heated with open grate. I might return the condensed water from the heater to the boiler and make a greater saving. This is not done at present.

Possibly before the meeting of the society we may have some cold weather, requiring the use of the apparatus, and if this paper produces any discussion by the members some careful experiments upon its performance may be laid before them; but at present I can give only the results of one imperfect and incomplete observation made during December, when the outside temperature was 45°.

Temperature of the air on its return and just before entering the heater, 59°.

Temperature of air issuing from the blower after passing through the heater, 112°.

Average temperanure of air in room of main store, on first floor, 75°.

Pressure of steam in the boiler by gauge, 40 pounds.

* This floor I only heat occasionally, as it is used principally for the storage of machinery. When necessary to heat it, I open the damper shown directly over the blower, and sufficient heated air will be driven through the opening to heat it comfortably in a few minutes.

THE NEW TORONTO PLUMBING BY-LAW.

THE new plumbing by-law adopted by the Toronto City Council a week ago, differs in many particulars from the by-law which it is designed to supersede. Journeymen plumbers as well as master plumbers will hereafter be required to pass an examination and obtain a license. No person is entitled to a license who is not a Canadian by birth or naturalization. The fee to be paid for a license by master plumbers' has been increased from one to ten dollars. The fee to be paid by journeymen plumbers is one dollar. The Superintendent of the Toronto Water Works takes the place of the Medical Health officer as judge of the fitness of applicants for licenses. If an applicant have not the necessary qualifications; he must agree to employ continously a regular educated practical and experienced plumber. The amount of security required for compliance with the by-law on the part of master plumbers is reduced from $1,000 to $100. Such security is to be approved of by the City Treasurer instead of the Medical Health Officer as formerly. All private drains laid by the city are to be taken to the inside of the wall where buildings are on the street line. The time for approving or rejecting plans and specifications is six days instead of ten days from date of filing, and the certificate of the City Engineer or Assistant City Engineer and Superintendent of Water Works shall be valid for six months from date of issue. No alteration in or reconstruction of existing plumbing arrangements will be allowed until plans of same have been approved of, and a permit issued as in the case of new work, and work of re-construction or alteration must be inspected and approved same as new work. Every water cock, bibb, tap or hydrant must have the name of the plumber attaching the same stamped thereon. One of the clauses added to the new by-law provides that every master plumber who shall himself, or by his apprentices, agents or employees, make any extensions of or alterations to, or shall remove any tap, pipe or any other fixture attached to the pipes of the water works shall, on the last day of the month in which such extension, alteration or removal is made, report the nature and extent of same in writing to the Superintendent of the Water Works Department upon printed forms to be supplied by said department, the correctness of which report shall be attested by statutory declaration to be made by the master plumber making such report.

Another clause provides that no plumber shall be allowed, without having first obtained a permit from the department, to open or shut off the street stop-cock connected with the service supplying any premises or buildings unless in case of urgent necessity to prevent loss or damage from flooding, or to make necessary repairs, or to test their work, and shall in every such case leave the stop-cock open or closed as they may find the same; provided always that any plumber who shall commit any damage or injury to said stop-cock or the service pipes of the department in so doing shall become responsible for the amount of such damage.

In future no pan closets will be allowed to be put into any building. Air pipes may be of standard wrought iron with steam fittings. Sheet metal will not be allowed. Plumbing work found on inspection to be satisfactory will be certified to at the expiration of 30 days from inspection, unless in the meantime it shall have become faulty or defective. Each member of the Board of Examiners who is not an official of the city will be paid a fee of five dollars for each session of the Board.

The above includes all the important changes in the new by-law as compared with the old.

THE TORONTO SANITARY ASSOCIATION.

"ARCHITECT" writes in the April number of *Medical Science* as follows: Some few years ago a Sanitary Association was organized in Toronto, and though we have not observed any notice of its meetings during this winter, we trust that this is not to be taken as an indication that members have become discouraged and allowed it to collapse. They did some good work during their first two sessions. A committee of the association gave valuable assistance in drafting the plumbing by-law, and a considerable number of papers were read and lectures delivered at their meetings, which were not only interesting, but valuable. Work of this kind has a double value, it not only benefits the members by putting into concrete form the result of their individual studies and enabling them to interchange ideas, but it affords a means of educating the general public on sanitary questions. There is no reason why a sufficient number of the general public should not be got to attend these meetings to fill a good size room. Indeed this was frequently the case during the first session. Has there been any falling off in the public interest in sanitary questions? If such is the fact there is surely no justification for it. We have not yet got a trunk sewer, the bay is a reeking cesspool; we have no garbage cremator; our water supply is insufficient in quantity and, at times, by no means above suspicion as to quality. Diptheria and typhoid are much more frequent visitors in our homes than they should be were our sanitary arrangements—not to say perfect—but reasonably good. The condition of our streets is at all times a disgrace to the city and a blot upon its fair fame.

These are but a few of the more glaring abuses which such an association should work at unceasingly until they are wholly suppressed. When that work is done it will be found that the horizon of its field has only widened, and that other work scarcely less important lies ready to its hand, Everything that in any way affects the public health comes within its sphere. We merely indicate the direction in which its efforts would naturally be turned: compulsory ventilation of manufactories and public buildings; the effects upon health of the gas supplied for our use; the providing of parks and recreation grounds; the proper placing and management of cattle markets; the provision of proper abattoirs; the prevention of adulteration of food and drink, the inspection of dairies; the question of public baths and wash-houses; teaching the poor to cook; the dissemination of correct scientific ideas on the subject of vaccination, suitable dress, preventive medicine and the care of the body generally. The list might be enlarged indefinitely, but enough has been said to show that there is work enough in sight to keep a sanitary association busy for a long time to come, and we may be sure that while human nature remains what it is, careless and indifferent about many vital questions, it will never be able to say that its work is done.

CHICAGO PLUMBERS AND SANITATORS.

THE Sanitary Committee of the Chicago Master Plumbers' Association included in one of its recent reports the following resolutions:

Resolved, That the aim of the Master Plumbers' Association will be to provide appropriate furnishings and perfect workmanship for its patrons, since it is acknowledged that plumbing and sewerage are no longer considered luxuries but necessities, and the increased population of our city demands that they be well and properly done.

Resolved, That the old style of plumbing be supplanted by a new and perfect system which will require the latest improvements in sanitary fixtures, which, added to good workmanship, will prove that the members of this association use only the best materials and employ none but skilled artisans to perform work in this line of business.

Resolved, That owners of buildings, or those having the construction of buildings in prospect, be requested to discourage the cheap contract work now so universal since we can vouchsafe no protection while this system remains in vogue.

Resolved, That periodical inspection of plumbing is necessary, since constant use of sewer soil and waste pipes engenders the rapid decay of even the strongest and best of any of our sanitary appliances. Renovations, watchfulness and cleanliness are necessary re-

quirements, since neglect of such care jeopardizes the lives of the family and breaks up the serenity of the home.

Resolved, That we as an association lend every possible assistance to the health department of this city in enforcing strict sanitary laws, which will insure a diffusion of sanitary knowledge, and an active co-operation on the part of citizens to provide good sanitation.

The by-law authorizing the Kingston City Council to expend $140,000 for improving the water works system was passed by a majority of 409 votes.

The sixth annual convention of the National Association of Master Plumbers of the United States will be held in Boston this year on June 26, 27, and 28.

The Toronto Board of Health has wisely recommended the Council to remove garbage daily during the summer months as suggested by the Medical Health Officer.

Plumbing inspector Benjamin Kirk, of this city, is ably contending for the superiority of wiped joints as against cup joints in the columns of the *Engineering and Building Record*.

From life's rich pudding many a plumb.
The ice man plucks in summer,
But in the winter time he knuck-
Les down to one who's plumber.
—*Burlington Free Press.*

Mr. Mann, of Montreal, who has been erecting a garbage crematory in the city of Chicago, pointed out to the people there the danger to the public health of allowing barrels and boxes full of garbage to stand for hours and days in lanes and on the public streets. In Montreal persons are fined for placing refuse on the streets.

Mr. Henry Lamb, of Rochester, offers through the American Health Association two prizes of $500 and $200 respectively for the best essays on "Practical Sanitary and Economic Cooking Adapted to Persons of Moderate and Small Means." Competition is open to authors of any nationality, but papers must be written in the English language.

The London *Metal Worker* speaks approvingly of rust joints for iron pipes, the sole objection noted being their great permanency. A rough formula for making the joints is given as follows: Take clean iron fillings, mix them with a little sal ammoniac in a wet state and drive them into the joint over a gasket. Sometimes a little flour of sulphur is added.

Complaints are heard regarding the condition of some of the cow byres in the city of London, Ont. It is contended that the filthy condition of some of these places precludes the possibility of pure milk being supplied to the citizens. This is a matter that the Health Officers of London and other Canadian cities should enquire into. Pure milk is as necessary as pure water for the maintenance of the public health.

The *Sanitary News* objects to city authorities enforcing the use of water meters, on the ground that people in poor circumstances will endanger their health in attempting to economize in the use of water. Our contemporary says:—Increase your license, add to your taxes on land, if necessary, and on whisky and tobacco, but let the people have free water and the more they use, the better it will be for the community."

Mr. Frist, in the Dominion Parliament the other day, expressed the opinion that the Canadian guarantee regulations were inadequate for the protection of the country from the entrance of contagious diseases. The premier, in reply, stated that probably no system of quarantine existed which might not be improved. It is very necessary that everything possible should be done to perfect the Canadian stem.

Messrs. Moffatt, Hodgins & Clarke, of Watertown, N. Y., have arranged with the Town Council of Cobourg, Ont., to put down between six and seven miles of mains and sixty-seven hydrants, certain of which may be used for street watering purposes. The town will thus be furnished with a complete system of waterworks without investing any money; they will pay an annual rental of $3,000, with the privilege of purchasing should they at any time desire it.

eign competitors must have their work in by Jan. 1, 1893.

Gananoque, Ont., has by a majority of 66 decided against a five years' contract for electric lighting.

We have received from the American Public Health Association copies, in pamphlet form, of prize essays entitled "Healthy Homes and Foods for the Working Classes," by Victor C. Vaughan, M. D. Ph. D., professor in University of Michigan.; "The Sanitary Conditions and Necessities of School Houses and School Life," by D. F. Lincoln, M. C., Boston, Mass.; "The Preventible Causes of Disease, Injury and Death in American Manufactories and Workshops, and the best Means and Appliances for Preventing and Avoiding Them," by Geo. H. Ireland, Springfield, Mass.; "Disinfection and Individual Prophylasis against Infectious Diseases," by Geo. M. Sternberg, M.D. These valuable treatises may be obtained at ten and five cents each on application to Dr. Irving A. Walker, Secretary, Concord, N. B.

A contemporary remarks that in ceiling decoration all strong colors should be definitely separated from each other by light lines, fillets or small moldings. If the cornice presents any small flat surfaces, a simple conventional flower or geometrical pattern can often be used to great advantage, care being taken not to make it too prominent, and in no way to form a dark molded frame for a mass of light tinted ceiling. It is not a very costly matter to lay on to a ceiling having small wood moldings formed into panels and painted, paper fitting the panels and filled in with some very light diaper paper of stencil enrichment fitting the panels.

The following are combinations of colors in certain choice flowers, which may suggestively aid combination of hues in decorative work: Vermilion, suffused with scarlet, and penciled with dark tints; ground of deep crimson, shaded with bronze; lavender, with undulatory margin of white; white, with carmine feathered markings; brilliant pink, margined white, blotched with maroon; bronze red, with white margin and deep chocolate-colored spots; lilac color, blotched with maroon; bronze red with deep chocolate-colored spots; intense deep crimson, with black spots; deep rosy purple, with maroon, featherlike splashes.

PERSONAL.

E. Rogers & Co., plumbers, London, are going out of business.

Messrs. Plastam Bros., plumbers, of London, Ont., are reported to have made an assignment.

Mr. E. O. Graydon has been appointed assistant city engineer by the London, Ont., City Council.

Hon. James McShane, Minister of Public Works in the Quebec Provincial Cabinet, has resigned.

Mr. Fred. Henry, late Assistant City Engineer, of London, Ont., has left that city to practice his profession in New York.

Mr. W. J. Gibson, who for fifteen years was connected with the water works department of this city, died a fortnight ago.

Mr. Wm. Lyons, contractor, has entered a suit against Windsor for $900 extra work on Bruce Avenue sewer, which will be tried at the spring assizes. The town offered to settle the claim for $150.

The wife of Sandford Fleming, the well-known engineer, died recently at Ottawa, aged 57 years. She was a daughter of the late Mr. James Hall, Sheriff of Peterboro', and was highly esteemed for her Christian qualities.

The Master Carpenters' Association, of Toronto, has unanimously re-elected the following officers for the ensuing year:—President, J. J. Withrow; Vice-President, Geo. Moir; Treasurer, William Boon; Secretary, William Simpson; Committee, Wm. Forbes, William Simpson, Queen street west, C. R. S. Dinnick, Geo. Gall, George Burry.

The *Week* of March 22nd contains a biographical sketch of Mr. Sandford Fleming, C. E., L. L. D., C. M. G., from the pen of Rev. Principal Grant, of Kingston. Mr. Fleming was born in Scotland, where he spent the first eighteen years of his life. At that age he came to Canada, where he has lived for forty-three years. During this period he has been connected wirh many important public undertakings. Mr. Fleming has also attained considerable prominence as a writer.

Sir Alexander T. Galt is projecting a railway bridge across the St. Lawrence from Prescott to Ogdensburg, and asks for incorporation as the Grenville International Bridge Co., for construction purposes.

Amongst the signs of the improved class of buildings now going up and projected in the larger cities of Canada is the greatly increased employment of rolled iron joists, which are now generally specified for all first-class buildings, both public and mercantile. Besides the advantage of greater strength, and occupying far less space than timber, the immunity from danger from fire is appreciated as of the utmost importance. The improved methods of manufacture has now brought down the price so as to freely compete with the present prices of timber. Mr. G. Lomer, of Montreal, who has successfully carried out some of the largest contracts with the Government and railway corporations, solicits correspondence from architects and builders as per his notice in another column.

COMPOUND FOR PATCHING STONE.

THE restoration of some of the most important stone structures in Paris has been mainly accomplished by means of a metallic cement invented by Professor Brune. It consists of a powder and a liquid, the first composed of two parts by weight of oxide of zinc, two of crushed limestone of a hard nature, and one of crushed grit, the whole intimately mixed and ground, ochre in suitable proportions being added as a coloring matter. The liquid employed consists of a saturated solution of zinc in commercial hydrochloric acid, to which is added a part by weight of hydrochlorate of ammonia, equal to one-sixth that of the dissolved zinc, and this liquid is diluted with two-thirds of its bulk of water. In using the cement, one pound of the powder is mixed with two and a half pints of the liquid. The cement hardens very quickly and is of great strength.

BRIDGING.

BRIDGING floors is not only to prevent the joist overturning, but is principally to distribute the weight resting directly on one joist over those joists immediately adjacent, and in that way to considerably stiffen the floor as a whole. The pieces of timber of which the bridging is composed may, and do act either as ties or struts, according to the manner in which the load is centered, and in the case of a moving load, and of a person passing over the floor, will act alternately as ties and struts in quick succession. The strutting being placed obliquely to the joists, the strain is practically neither that of a direct tie, nor of a direct strut, that is, neither simple compression nor simple tension in either case, but is in both modified by a cross strain. There is some tendency for the joists to turn over, which augments the cross strain, so that, of the three stresses, the cross strain is of most importance.

Now, it is a very well-known rule, that the strength of a beam or a piece of timber subjected to a cross strain is directly as its breadth and as the square of its depth, and it will be obvious, therefore, that the system of placing the bridging with its greatest scantling vertical is the proper one, and is a good deal stronger than the system usually employed. In the first system the bridging is reversed alternately so that the pieces may butt against the joists at points directly opposite one another, which tends to further strengthen and stiffen the floor.

The only advantage in the second system over the first is, that it does not necessitate a man turning round to nail the pieces alternately as he comes to them, and therefore is saving of a small amount of time, but when it is considerd how much additional strength is obtained by the first method, it will be seen that the saving of time under the circumstances is by no means a wise economy.—*Building.*

STRENGTH OF BUILDING MATERIALS.

MR. J. B. JOHNSON, in an article in the *Journal of the Engineering Societies*, gives some interesting points in regard to testing the strength of building materials. Speaking of tests of brick and stone, he says: "Most tests on substances have been in cubes, but such results are uniformly too great. In the case of a brick, a crushing test made flatwise, on one brick, is very misleading. From three sereis of tests on standard St. Louis brick from as many manufacturers, fifty brick being tested for each firm, I have included that a brick, crushed endwise, will always carry considerably more than the same brick will stand in a wall. I took 24 brick graded from medium red to paving, and tested them endwise, and then 24 brick similarly graded cut into halves, and four half bricks piled into a column with thin joints of neat Portland cement and left to harden for three weeks. The average strength of the endwise test was 3,532 pounds to the square inch, and of the flatwise column test, was 2,635 pounds to the square inch, and showing that the endwise test gave a strength about one-third more than a flatwise test, piled four high. All these brick were dry pressed, one lot hydraulic pressed, one mechanically pressed and one made with a hammer blow. Those made by the mechanical pressure were considerably stronger than the average, and those by the hammer blow the weakest.

Stone and brick lose a large part of their strength when thoroughly wet. If their strength is required in foundations, or where they receive their full load when water-soaked, then they should be tested wet. If they are to withstand the action of frost then the amount of absorption is important, anything over 12 per cent. being objectionable, and liable to disintegrate from freezing.

Any beam, whether of wood or iron, is as much stronger when placed on its edge as when on its side, as the width is greater than the thickness. Thus the stick or bar of iron one inch by three inches, when used as a beam, is three times as strong when placed on its edge as when on its side. This is true only within limits. It would not be true of a piece of boiler plate, on account of the flexibility.

The atmospheric influences producing disintegration of bricks, tiles, etc., are noted by the *Chronique Industrielle* as being much less active and destructive in a season of continuous humidity than during alternately wet and dry periods. Their action also is obviously affected by the chemical and physical composition of the bricks and their degree of burning. An excess of sand destroys cohesion, and calcareous matter is reduced in burning to lime, which will be slaked by exposure to moisture, and, by the expansion which follows, causes disintegration.

The king of the Belgians has offered a prize of 25,000 francs (about $5,000) for the best work, in manuscript or print, on the means of procuring in abundance and at small cost the best quality of portable water for large cities, especially for Brussels and its suburbs, "regard being had to the future increase of population," French, English, Flemish, Italian, German or Spanish may be used, but for-

TENDERS

Will be received by the undersigned up to noon of

WEDNESDAY, April 25th, inst.,

FOR THE ERECTION OF

Pair of Semi-detached Houses

ON NORTH STREET, TORONTO.

The lowest nor any tender not necessarily accepted.

DARLING & CURRY.

THIS SPACE

BELONGS TO

J. C. SPENCE & SONS,

Manufacturers of ART STAINED GLASS

37 BLEURY STREET, MONTREAL.

MANUFACTURING MATERIALS.

PAINTING WOOD.

ONE coat of painting, says a correspondent of the *Mechanical News*, takes 20 pounds of lead and 4 gallons of oil per 100 square yards; the second coat 40 pounds of lead and 4 gallons of oil; the third, the same as the second—say 100 pounds of lead and 16 gallons of oil per 100 square yards for three coats.

One gallon of priming color covers 50 square yards.

"	"	white zinc	"	50	" "
"	"	white lead paint	"	44	" "
"	"	lead color	"	50	" "
"	"	black paint	"	50	" "
"	"	stone color	"	44	" "
"	"	yellow paint	"	44	" "
"	"	blue color	"	45	" "
"	"	green paint	"	45	" "
"	"	bright emerald	"	25	" "
"	"	bronze green	"	75	" "

Winnipeg streets will be block paved with British Columbia cedar.

Over 230 men are employed in the quarries on the mountain in Hamilton.

The Oshawa *Vindicator* says there is a fine opening in that vicinity for a brickyard.

The Dominion Marble Company is about being formed in Halifax, N. S., for the purpose of developing the valuable marble deposits at Mount Marble, West Bay and Cape Breton.

The Bryan Manufacturing Company, Toronto, will be incorporated with $30,000 capital stock for the sale of builders' supplies, etc.

The Owen Sound Quarrying and Construction Company, lately organized at Owen Sound, Ont., have two large quarries in operation.

It is said that certain Hamilton capitalists will start glassworks at Port Colborne, Ont., utilizing the natural gas found there so abundantly, as fuel.

Experiments recently made in England go to show that "Silicate cotton" nailed on the under side of the joists will prevent the spread of fire from a lower to an upper flat.

Messrs. A. Robb & Sons, Amherst, N. S., are manufacturing a system of hot water heating for residences, halls and stores. They are also introducing a hot air wood-burning furnace.

An ebony finish for wood is made by dissolving 4 ounces of shellac with 2 ounces of borax in half a gallon of water. Boil until a perfect solution is obtained, then add half an ounce of glycerine, after which add sufficient aniline black (soluble in water), and it is ready for use.

A serious fire took place recently in the Dominion Glass Company's works on Papineau Road, Montreal. A large portion of the interior was destroyed. The value of the building was $125,000, and the total loss is estimated at $35,000 or $40,000. Over one hundred men will be thrown out of employment.

A score of the largest lime dealers in Ontario have presented a petition through Messrs. Scott and Christie, of Toronto, to the Minister of Inland Revenue, asking that the Weights and Measures Act be so amended as to provide for a uniform method of selling lime by weight instead of by measurement throughout Canada. The Minister promises to consider the matter.

Captain Holmes, of Napanee, on behalf of Canadian glass manufacturers, has asked the Dominion Parliament to place a duty on the importation of cheap qualities of glass. It is claimed that importations from Belgium are destroying the demand for the Canadian article in spite of the fact that the latter is better in quality.

A paste that will adhere to whitewashed and all plastered surfaces is made as follows: Soften eighteen pounds of finely powdered bole in water; next boil one and a quarter pounds of glue, adding it to the above with two pounds of gypsum. The whole is to be diluted to a thin paste. When putting fine paper on old walls it is well to coat them with a ground paper, using this paste.

The following churches have been furnished by the Bennett Furnishing Co., of London, Canada, and Glasgow, Scotland:—St. Mary's church, Tottenham, Eng., architects, Messrs. Pugin & Pugin; Larbert parish church, Larbert, Scotland, architects, Messrs. Burnet & Sons, Glasgow, Scotland; St. Francis' church, Liverpool, to the order of Cardinal Manning; New Mission church, Hewel, Hampsted, architects, C. B. & J. C. Cutts; the English church, Lisbon, Portugal, architects, Messrs. Medland & Powell; St. Saviour's church, Holloway, London, Eng., architects, Messrs. Cutts; the Kensington Mission Church, London, Eng.; the Merchiston Mission Church, Edinburgh, Scotland, architect, R. Wilson, Esq; St. Mary's church, Dublin, Ireland; the chapel of the Charterhouse Schools, London, Eng., etc. The Company are also sole manufacturers of improved desks and fittings for the School Boards of London, Liverpool, Edinburgh, Glasgow, etc.

Latest Canadian Patents.

Art or Process of Wall and Ceiling Decoration.

No. 28,564. James S. Henderson, (assignee of Alfred Ottaway), Toronto, Ont., 25th February, 1888.

Claim.—The process of working paper upon a prepared linen or other fabric as a back, and painting and decorating said paper in suitable sizes as a decoration for walls, ceilings and other surfaces.

Flush Valve for Water Closets.

No. 28,437. Thomas Campbell and James H. McPartland, Saint John, N. B., dated 2nd February, 1888.

Claim 1st. The combination of the cylinder C and the piston A, substantially as and for the purpose hereinbefore set forth. *2nd.* The combination, with the cylinder C and the piston A, of the rod F and the down-pull G, substantially as and for the purpose hereinbefore set forth.

Heat Radiator.

No. 28,527. John R. Tracey, Winnipeg, Man., dated 13th February, 1888.

Claim 1st. The combination of outside casing B, cone A, with opening at I, inner pipe M. having hole at C, outer pipe N, having hole at D, handle E in horizontal slot, cross-bar H and vertical rod G, having narrow-shaped bottom, substantially as and for the purposes hereinbefore set forth. *2nd.* The combination of radiators and self-cleaning rod G, substantially as and for the purpose herein set forth.

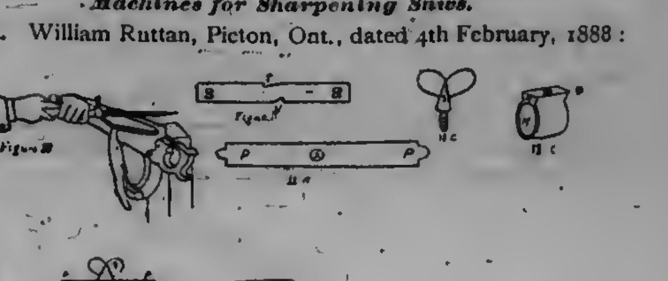
Means for Glazing Roofs, Etc.

No. 28,514. Joseph D. MacKenzie and Joseph Gillespie, London, Eng., 11th February, 1888.

Claim.—A solid metal sash-bar having its central web or feather and the inner surfaces of the grooves or channels covered by a protective sheating in combination with the glazing material applied over said sheating and covering the flanges of the sash-bar and part of its central web or feather, and overlapping the glass, substantially as and for the purposes set forth.

Machines for Sharpening Saws.

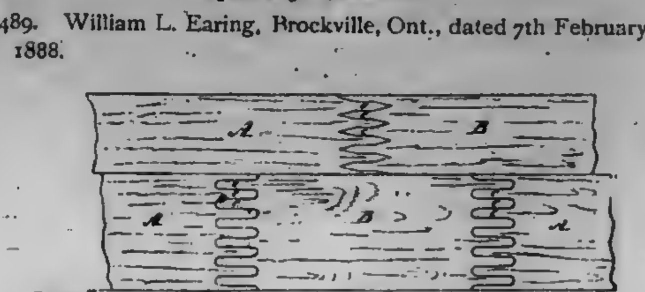
28,494. William Ruttan, Picton, Ont., dated 4th February, 1888:



Claim.—1st. The rake guide B, B, with slotted sides, in combination with the bevel guide P, P, substantially as and for the purposes hereinbefore set forth. 2nd. The bevel guide P, P, secured as above described, in combination with the rake guide B, B, substantially as and for the purposes hereinbefore set forth.

Splicing Lumber.

28,489. William L. Earing, Brockville, Ont., dated 7th February, 1888.



Claim.—The improvement in the art of splicing lumber, which consists in slotting the pieces to be joined lengthwise from the end, the intervening tenons parallel and slightly exceeding the slots in width, bevelling or rounding the ends of the slots and tenons to coincide, cementing the contact edges of the joint and driving the pieces endwise together, whereby the tenons will be compressed laterally together, and the bevelled or rounded ends crush into the bevelled or rounded ends of the slots throughout the whole thickness of stuff, to make an almost imperceptible and practically unbreakable joint, as set forth. 2. A joint or splice formed by slots D and tenons C cut endwise in pieces of board to be joined, the tenons bevelled or half round at the points, and the slots bevelled or half round at the ends, the tenons having parallel walls for a portion of their length and slightly exceeding the slots in width, the joint glued and the pieces driven endwise together, as set forth.

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.		
1¼ and thicker clear picks, Am. ins.	$34 00@35 00	
1½ and thicker, three uppers, Am. ins		40 00
1½ and thicker, pickings, Am. ins		30 00
1 x 10 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
1 x 10 and 12 dressing	14 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
1 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1½ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	16 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		15 00
1½ inch flooring	14 00	15 00
XXX shingles, sawn	$2 40@2 50	
XX shingles, sawn	1 30	1 50
Eastlake painted iron shingles, per square, (10,000 feet)		4 50
Eastlake painted tin shingles, per square		4 50
Eastlake genuine galvanized iron shingles, per square		7 90
Metalion brick siding, per square		3 50
Special siding, per square		3 50
Lath, sawn		1 80
YARD QUOTATIONS.		
Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		12 00
Shipping cull boards, stocks		13 00
Scantling and joist, up to 16 ft		14 00
" " 18 ft		15 00
" " 20 ft		16 00
" " 22 ft		17 00
" " 24 ft		19 00
" " 26 ft		20 00
" " 28 ft		22 00
" " 30 ft		24 00
" " 32 ft		26 00
" " 34 ft		28 50
" " 36 ft		30 00
" " 38 ft		32 00
" " 40 to 44 ft		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board	18 00	20 00
Dressing stocks	16 00	18 00
Picks, American inspection		40 00
Three uppers, American inspection		50 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 4 x 14, per M		12 00
B. M.		
1½ inch flooring, dressed	25 00	30 00
1½ " rough	14 00	15 00
1½ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		2 25
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

BRICK.—₱ M.

Common Walling		$ 8 50
Good Facing		10 00
Sewer		9 50

Stone:

Common Rubble, Per Toise, delivered		14 00
Large flat " " "		18 00
Foundation Blocks, " Cubic Foot		40

Slate: Roofing (₱ *square*).

" green	5 00	6 00
" " unfading	5 00	6 00
" purple	5 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me	5 50	8 00
" black slate		7 50
Tiles, American, ₱ M		
N. Peach Bottom, warranted unfading		

Sand:

Per Load of 1½ Cubic Yards		1 25

PAINTS. *(In oil, ₱ lb.)*

White lead, Can	6	6 50
" zinc, Can	6½	8 50
Red lead, Eng	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" Indian, Eng	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (₱ *Imp. gal.*)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3¼
Whiting, dry	75	1 00
Paris white, Eng., dry	1 05	1 50
Litharge, Am., "	6½	8
Sienna, burnt	15	20
Umber, "	8	12

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey		40
" " " White		60
Plaster, Calcined, New Brunswick		2 20
" " Nova Scotia		2 10
Hair, Plasterers', per bag		1 00
Cement, Portland, per bbl		3 00
" Thorold, "		1 50
" Queenston, "		1 50

HARDWARE.

Cut Nails:

American Pattern, 1¼ inch, per keg		4 50
" " 1½ to 1¾ inch, per keg		3 75
Canadian Pattern, 1¼ inch, per keg		$ 4 00
" " 1½ to 1¾ inch, per keg		3 50
" " 2 to 2¾ inch, "		3 50
" " 2½ to 2¾ inch, "		3 25
" " 3 inch and larger		3 00
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg		6 05
" " 1¼ inch, "		5 30
" " 1½ " "		5 05
" " 1¾ " "		3 60
" " 2 inch and larger		4 00

Iron, etc.

Refined, ₱ 100 lb. or ordinary size	2 25	2 35
Common, ₱ 100 lbs	2 00	2 10
Patent metals, ₱ lb	0 00	0 11
Anchors, ₱ lb	0 05½	0 06
Chain cables, ₱ lb	0 03	0 06
Rigging chains, per lb	0 03	0 3⅔

ST. JOHN, N. B.

Lumber.

Spruce deals, Bay Fundy Mills	8 00	8 25
Spruce deals, City Mills	8 50	9 50
Aristook P. B., Nos. 1 and 2	40 00	45 00
No. 3	30 00	35 00
No. 4	15 00	20 00
Aristook P. B. shipping	15 00	16 00
Common	12 00	13 00
Spruce boards	7 00	8 00
Spruce scantling (unst'd)	7 00	8 00
Spruce, dimensions	11 00	14 00
Pine clapboards, extra	5 00	40 00
No. 1	0 00	30 00
No. 2	30 00	20 00
No. 3	11 00	12 00
Laths, spruce	1 25	1 35
Laths, pine	5 50	8 00
Palings, spruce	5 50	8 00

Iron, etc.

Refined, ₱ 100 lb or ordinary size	2 25	0 00
Common, 100lb	2 10	0 00
Patent metals, ₱ lb	0 00	0 11
Anchors, ₱ lb	0 00	0 00
Chain cables, ₱ lb	0 03	0 06
Rigging chains, ₱ lb	0 03	0 3⅔

Nails.

Cut, 3dy, ₱100lb	3 75	0 40
Cut, other sizes	2 74	3 50
Ship Spikes	3 70	5 00
Galvanized	5 25	6 50

MONTREAL PRICES.

Cement, etc.

Portland Cement, per barrel	$ 2 75@	3 25
Roman " "	2 75	3 00
Fire Bricks, per M	22 50	27 50

Cut Nails:

Hot-cut Am. or Can. pattern, 3 inch and above		$2 90
Hot-cut Am. or Can. pattern, 2¾ inch and above		3 15
Hot-Cut Am. or Can. pattern, 2¼ and 2 inch		3 40
Am. pattern, 1½ and 1¾ inch hot-cut		3 60
" " 1¼ inch " "		4 40
Can. Pattern, cold-cut, 1½ and 1¾ inch		3 40
" " 1¼ inch		3 95
Finishing Nails, per 100 lb. keg, 1¼ and 1½ inch	$ 5 55	4 80
Finishing Nails, per 100 lb. keg, 1½ to 1¾ inch	4 55	4 30
Finishing Noils, per 100 lb. keg, 2 inch and up		3 80

Lumber, Etc.

Ash, 1 to 4 in., M	$13 00@	25 00
Birch, 1 to 4 inch, M	15 00	25 00
Basswood	18 00	20 00
Walnut, per M	60 00	95 00
Butternut, per M	35 00	40 00
Cedar, flat	00 04	00 06
Cherry, per M	80 00	100 00
Elm, Soft, 1st	15 00	17 00
Elm, Rock	25 00	30 00
Maple, hard, M	25 00	30 00
Maple, Soft	16 00	20 00
Oak, M	40 00	50 00
Pine, select, M	38 00	40 00
Pine, 2nd quality, M	28 00	30 00
Shipping Culls	14 00	16 00
Mill Culls	8 00	10 00
Lath, M	1 75	2 00
Spruce, 1 to 2 inch, M	10 00	13 00
" Culls	4 50	6 00
Shingles, 1st quality	2 00	3 00
" 2nd "	1 25	2 00

Paints, etc.

White Lead, pure, 25 to 100 lb. kegs	5 50	6 50
" No. 1	5 50	5 75
" No. 2	4 75	5 25
" No. 3	4 50	4 75
" dry	5 50	6 00
Venetian Red, English	1 50	1 75
Yellow Ochre, French	1 25	3 00
Whiting, London, washed	0 50	0 60
" Paris, "	1 15	1 25

Oils:

Linseed, raw	0 59	0 60
" boiled	0 62	0 63
Olive, pure	1 00	1 15
" machinery	0 95	1 00
" extra, qt., per case	3 00	3 20
" " pts., "	2 40	2 60
" " ½ pts., "	2 70	3 05
Spirits turpentine	0 59	0 60

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A First-class DETAIL TABLE,
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St. Pancras Iron Work, Wro't Iron Stable Fittings, London, Eng.
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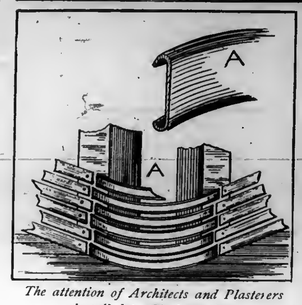
Write for Catalogue of above Goods. Estimates given on Special Hardware by any Architect.



The attention of Architects and Plasterers is called to this invention.
RADIGAN'S PATENT
METALLIC LATH.
THE object of this invention is to form circular corners on stud partitions, both outside and inside, when required, or only on the outside. This has hitherto been done by making the grounds with coopers' laths, which, owing to shrinkage, caused the plaster to crack—but curves of any required radius may be made with these Metallic Laths, and which will form a strong and firm ground in line with the wooden lathing for plastering on, and as shown in cut A, the laths are keyed top and bottom, thus forming a double key.
Give them a trial and be convinced. Send for Circulars and Price List.
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COMPLETE OUTFITS for CONTRACTORS and BUILDERS.
Machines for ripping, cross-cutting, scroll-sawing, mortising and tenoning, forming edges, grooving, gaining, rabbeting, cutting dadoes, and turning. Builders use our Hand Circular Rip Saw for the greater portion of their ripping in preference to carting their lumber to a mill five minute's drive from their shops. The same is true in regard to scroll sawing, mortising, tenoning, cutting stuff for drawers boxes, etc. Builders using these machines can bid lower and save more money from their contracts than by any other means.
Read the Following Letters from Builders:
CLARENCE F. LEE, carpenter and builder, Morristown, N. J., says: "I have had one of your Hand Circular Rip-Saws for about three months, and am much pleased with it. Have done the ripping for 15 houses in that time, which is over forty miles through inch boards. Have ripped as high as 3-inch plank. Table is also good for rabbeting; having rabbeted all jambs and sawed all drips for 200 windows."
ALEX. SHIELDS, Lima Ohio, says: "A few days since we had some 150 small drawers to make for a drug store; the steam power mill wanted 50 cents each for making them. With my foot power machinery I made them, and saved $25 above good wages on the job. If desired, these machines will be sold ON TRIAL.
The purchaser can have ample time to test them in his own shop and on the work he wishes them to do. Descriptive Catalogue and Price List Free.
W. F. & JOHN BARNES CO., No. 1999 Ruby St. Rockford, Ill.
A. R. WILLIAMS - Soho Machine Works - TORONTO
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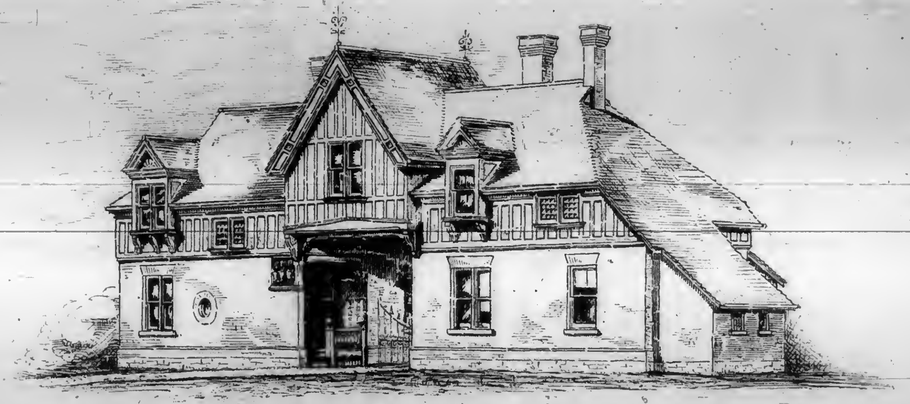

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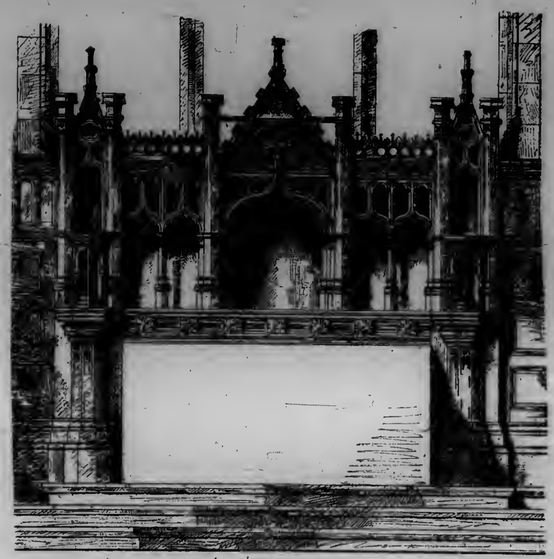

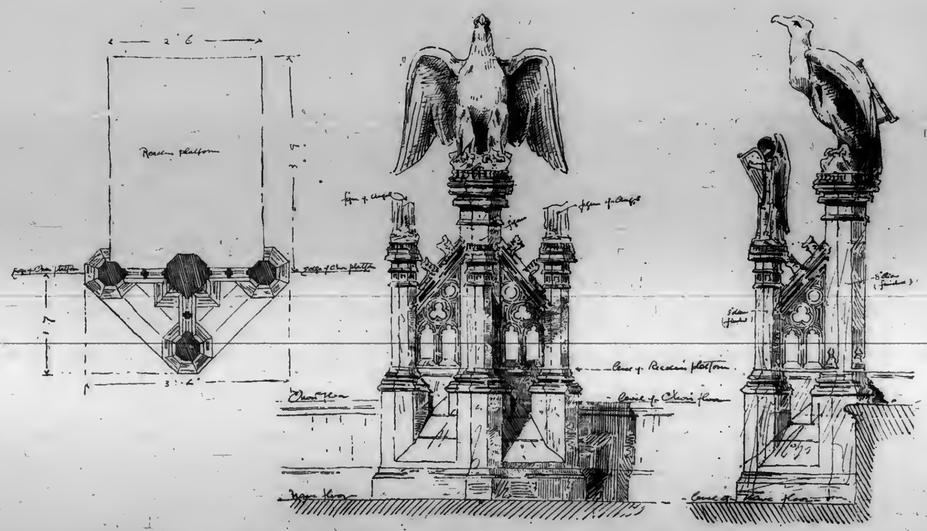

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VOL. I.—No. V. TORONTO, CANADA, MAY, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—

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C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

FROM time to time the daily newspapers report the case of some unfortunate workman who has been buried alive or fatally injured by the caving in of the drain or sewer in which he was working. The frequency of such accidents would seem to indicate that some contractors do not take the precautions that are necessary to protect workmen in their employ from injury. City engineers and others whose duty it is to supervise the work of contractors, should see to it that the latter are not allowed to shirk their duty in this important particular.

THE average house owner is not deeply interested in the health of his tenants, and goes no farther in the direction of sanitary improvements than the law or self interest compels him. Canadian tenants should take a leaf out of the book of the Chicago people, who are just now using the house owners' self-interest as a lever to keep their buildings in a sanitary condition. A Chicago journal states that "the public is getting more sensitive to sewer air every year, and to recognize its effects when it is not perceptible by its odor; and that whole blocks of nice-looking residences stand empty in some localities because when inhabited funerals were so numerous as to make them notorious." Canadian house owners who are seeking only to reap large profits from their investments, and have given no thought or care to the sanitary condition of their premises, will do well to take warning.

COMMUNITIES, like individuals, often fail to appreciate their advantages until dispossessed of them. Through neglect on the part of its official representatives, the city of Toronto has forfeited control of the Queen's Park and Avenue. The property, unless some new arrangement can be made, will revert to the the University. Seeing that no land for park purposes is obtainable near the centre of the city, it is very desirable that negotiations should be commenced on the part of the city with a view to obtaining a new lease of the property. Toronto is sadly deficient in the matter of public parks and squares, which conduce so greatly to the pleasure and comfort of residents in large cities, and form centres of attraction for visitors. In this park transaction the city is certain to be the loser, even though it should again secure control of the property, as the University will refuse to forego the advantage it has gained unless liberally compensated.

AN outcome of the recent difficulty between the master builders and their employees at Hamilton is the formation of an Independent Workingmen's Association. The members of this new organization state that they are not in sympathy with the methods of the unions or with their attitude towards the employers. They will endeavor to bring about a more friendly feeling between employers and employees, and favor a graded scale of wages in comparison with the skill of individual workmen. This organization is the natural outgrowth of the tyrannical conduct of the unions, whose members are expected, and indeed compelled, to sacrifice their individual opinions and desires, and follow the dictates of their leaders. If the unions hope to hold the allegiance of men of independent minds, they will find it necessary to allow their members greater individual liberty; and also they will need to recognize the justice of paying workmen in proportion to the amount and quality of the work they are able to perform.

SEVERAL contributors to this journal have recently pointed to the necessity for a standard of qualification which every person aspiring to practice architecture should be required to measure up to. The subject is a timely one, involving not only the interests of architects, but of the public as well. We have wisely decided that no person should be allowed to carry on the business of a plumber without first having passed an examination showing himself to be possessed of the necessary knowledge. He is even required to give a bond for the proper performance of his duties. Does not as much responsibility rest upon the architect as the guardian of human health and life, as upon the plumber? If so, why should not the one be required to prove his qualifications as well as the other? The time is surely coming when architecture will be placed on equal footing with the other professions, when only those who have fitted themselves by a proper course of study will be allowed to practice it. The duly qualified architects of the present day should unite as a body and seek to obtain the passing of the legislation necessary to place the profession upon the higher level where it properly belongs.

A FEW summers ago the Toronto City Council tried the experiment of planting flowers along the boulevards in Queen's Park Avenue. The result was most discouraging. Before the season was half gone scarcely a flower was to be seen. They were plucked by cruel passers-by almost as soon as their petals opened. Many of the plants were torn up by the roots, and either carried away or trampled under foot. The Council naturally enough concluded that it was useless to spend money in attempting to beautify the public thoroughfares and render the city attractive, so long as a portion of the population at least were so unappreciative as to wilfully destroy instead of seeking to protect and preserve what was designed to increase their pleasure and happiness. We observe that the City Council, into whose hands has recently passed the management of the Horticultural Gardens, will again test public appreciation in this direction, by removing the wooden fence and allowing everybody to have free ingress to this delightful spot. We trust the result will prove that refining and civilizing influences have been at work among all classes of our citizens, and that all will unite in showing their appreciation of every effort put forth to make the city of Toronto as attractive as it is substantially prosperous.

THE City Council of Peterborough, Ont., are considering the introduction of a system of sewerage under the terms of a public competition. The proposal is to submit the plans to a committee of three engineers as arbitors—one to be selected by the city, one by the competitors, and the third by the other two; the successful competitor to have the commission of the execution of the work. This commends itself as the fairest tribunal before which any competitive plans can be laid; still, in view of the unsatisfactory nature of all competitions, we cannot endorse the scheme as heartily as we could desire. The questions at stake in the planning and laying out of a system of sewerage are very weighty, and require a great deal of thought. Few competitors can afford the time and money to visit a city and take in all the points, on the mere chance of gaining a prize, which will not compensate them for their time, unless they obtain the first prize. We have now several engineers of eminence in sanitary science in this province, and if gratuitous advice is ever of any value, we offer it to the City Council of Peterborough, and advise them to seek out and employ a consulting engineer. Let him have the surveys made by some one conversant with the needs of the city, inform him of any special points as to discharge of sewerage and areas to be specially sewered at once, and leave him from his experience to propound the most satisfactory system he can devise.

IT is probable that the eastern gap of the Toronto harbor will be dredged to allow of the passage being used by large vessels. If such should be done, some provision should be made which will allow of the erection of a swing bridge. We must have the means of reaching the Island by other ways than by the Island ferries. A street car line laid along the lake edge of the Island, and connected with the street car service of this city would meet the wants of a large number of our citizens. This line could be connected with the east and west end of the King street lines, and a belt line of cars run, with which all the other lines in the city could connect. Another belt line could be run by laying a line of rails up Bathurst street to College street, and running a line of cars along this route to the Island by way of Parliament street. A third belt line could be run by way of Bathurst street to Bloor street, along Bloor to Sherbourne street, and by way of Howard street to Parliament street, and thence to the Island. With these systems of street car lines in operation, ready access to the Island could be gained from all parts of the city. Arrangements could be made to use these tracks for the conveying of street sweepings and other refuse suitable for the purpose to the Island on cars or waggons. This work should be done in the early morning or at night. By this means the Island could be built up by the addition of material which would be most valuable when placed thereon, but which is of no value in the city. The distribution of material on the Island would turn it into a fertile garden, and make it possible to lay out a beautiful park which would be the resort of our citizens during the

heated term. It would also remove the necessity of dumping this material in the low lying parts of the city or along the bay front, where it must eventually cause trouble. That the Island will some day be turned into a most beautiful park, resorted to by many thousands of our citizens no one can doubt. The question is, how may it be done in the shortest time and in the most economical manner? If some definite line of action is adopted, and year by year it is worked upon, it will not be very long before a very decided improvement is noticeable.

WE gave a word of caution to builders recently against yielding up their hard-earned dollars to the persuasiveness of smooth-tongued representatives of Co-operative Building Plan Associations, or publishers of what are called in the United States "ready-made misfit building plans." The warnirg, as we have since learned, was a timely one, although we regret that it came too late to save some. A builder in this city sadly confessed the other day that he was unable at present to subscribe for the CANADIAN ARCHITECT AND BUILDER as he had recently thrown away fifteen dollars on a book of "misfit plans." He frankly confessed that he had been badly "sold," but seemed to find comfort in the fact that the owner of a neighboring shop had been "taken in" also. The latter on being spoken to, showed plainly by his manner that the subject was not a pleasant one to him. Both men admitted that while they had each got a very nice picture book, every attempt to apply the information printed therein to practical purposes had resulted in utter failure.

THERE is much need of reform in the operation of the by-law which is supposed to govern the issuing of building permits in the city of Toronto. We do not at present know all the provisions of the existing by-law, but we do know that some of the most important are scarcely if ever complied with. Persons intending to build within the fire limits are supposed under this by-law to submit plans of the proposed building for the approval of the Building Inspector, and to obtain a permit before the work is commenced. Instead of this being done, buildings are in the majority of cases commenced and partially or wholly erected before a permit authorizing the work to be done is granted. The Building Inspector has the power in such cases, if the provisions of the by-law have been disregarded, to compel the pulling down of the work and its reconstruction in proper form, but how often is this power exercised? Not very often, if in any case, as the continued noncompliance with the by-law plainly shows. The by-law as it stands at present is a farce, and entirely fails of its object. Every person intending to put up a structure within the city limits should be compelled to obtain a building permit from the building inspector *before commencing the work*. This would insure the proper erection of buildings, and would furnish a reliable record of the number and value of new buildings put up each year. We hope to see this reform carried out.

WITH this issue we present the fifth number of the CANADIAN ARCHITECT AND BUILDER to the public. The four numbers that have already been published, we believe have not been wanting in merit. That we have not done all that we could wish, we are free to admit; but we hope that our shortcomings will be forgiven. It is our desire to make this journal as valuable as possible to all interested in architecture or any of the kindred branches. To that end we will be very much obliged for any suggestions with which we may be furnished. We may not be able to follow all the suggestions which we may receive, but they will at least give us some idea of the lines along which we should proceed to satisfy the largest number. There are many who will grumble and find fault for the pleasure it gives them. From these people we are not at all likely to receive much advice that will be of service. There are others, however, whose opinions we would value if they would only favor us with them. We will be exceedingly thankful if they will take sufficient interest in us to forward their views. The position of this journal is now assured, and all that remains to be done is to increase its usefulness to such extent as we may be able to do by the experience we are gaining. Our advertising patronage is extending, and before long we will have a very complete and representative list of all the important manufacturers and dealers in building materials. As this paper is being taken by nearly all the architects and contractors of this country, its value as an advertising medium is beyond dispute. We will not at present speak of the improvements which it is intended to make with the commencement of the second year. They will not be few, and we believe that in all cases they will be along lines satisfactory to our subscribers and advertisers. If those persons who take an interest in this journal would advance its welfare whenever the opportunity offered by increasing its subscription lists and gaining for it advertisements, we should feel very grateful. As this is the only Canadian journal devoted to the interests of architecture and its sister arts, we would ask for the cordial support of all Canadians who love their country and hope to see it as rapidly advance in the love of art as it has already done in more material interests.

AT the corner of King and Yonge streets in this city there was a very serious blockade of vehicles the other day. At the time there did not seem to be any unusual amount of traffic, but it so happened that a number of large drays and street cars met and caused a serious stoppage. If such stoppages occur frequently with the present amount of traffic, what may be expected when it is doubled or trebled, as no doubt it will be in a few years? An effort should be made to have the intersection of all important streets enlarged. With the present amount of space very little traffic will cause a blockade, because only one vehicle can pass through at at a time, and if the right of way is held by teams passing along one of the streets, those on the other must wait until they have passed. The two north corners of King and Yonge streets are now occupied by old buildings, which must in a very short time be taken down and new buildings erected. If improvements are made on these corners before the intersection is enlarged by the expropriation of the angles, it will be made more difficult and expensive to effect this most necessary object. There are a number of places in this city where the traffic will be so great in the near future that there must be continual trouble, and some effort should be made to provide a remedy, before almost insurmountable impediments are placed in the way by the erection of costly improvements. There has not been in the past very much belief in the future greatness of this city, and consequently very little has been done to make provision for the requirements of the future. Where everything has been so carelessly done, and we are now suffering the consequences, one would think that some attempt would be made to show our belief in the future of the city and our desire to remove obstacles from the path of our descendants. As is well known, the intersections of streets in London have been enlarged with what they call circuses, which allow of the free passage of vehicles into the different streets leading into these circuses. The traffic in some of the streets in London is tremendous, and yet there is comparatively little stoppage in those streets. Nearly all the blockades in New York are caused by the blocking of traffic at the intersection of narrow but important streets. Having this knowledge of what has occurred in large cities, and the methods adopted to correct the evil, we should make some use of their experience, and make wise provisions for the future. If we do not, our descendants will not thank us for our lack of foresight or indifference to their interests.

THE Royal Canadian Academy Exhibition was formally opened by His Excellency the Governor General on Monday evening, May 7th. At nine o'clock His Excellency, accompanied by the Marchioness, Lady Macdonald, the Lieut.-Governor of Ontario, Col. Gzoroski and aide de camp Sheatfield and Anson, arrived at the Granite rink where the Exhibition is being held. They were received by Mr. L. R. O'Brien, president of the Academy, Mr. A. C. Hutchinson and Mr. A. Patterson, and conducted to the platform, when the proceedings were commenced. The President welcomed the distinguished visitors in a few well chosen sentences, and then proceeded to speak on the progress of art in this country. He regretted deeply the difficulty of arousing in the people any sentiment in favor of art; but hoped that the time was not distant when the influence of the Academy and of its members would be apparent in a higher appreciation and knowledge of art by our people. The Hon. G. W. Ross welcomed the Governor-General on behalf of the Ontario Government. He acknowledged the debt of gratitude he was under to His Excellency for the advice and assistance he had given him in the making of the necessary arrangements to teach art in the schools, the result being that where a few years ago art was not taught in the schools, it is now taught to many thousands, and "advanced" and "still further advanced" art at that. The Hon. Mr. Ross also congratulated the members of the Academy on the great excellence of the Exhibition.

Lord Lansdowne, in a few words, thanked the speakers for their kind expressions of esteem for himself and Lady Lansdowne. He also spoke many encouraging words to the members of the Academy and advised them to strive manfully for the advancement of art in this country. He likewise made a suggestion which it is hoped many of those present will not allow to pass their memory, viz., that there are many wealthy men in the community who could afford to buy one or two good pictures in a year to beautify their costly homes. In so doing they would receive large returns in the education in art which they and their families would derive, and they would at the same time be giving great assistance to Canadian artists. If a man could not sell his pictures in his native land there was no encouragement for him to remain, and we would lose men which our country could ill afford to part with.

The east end of the curling rink has been partitioned off and set apart for the exhibition of the pictures. The space has been divided into three rooms—a large one in the center, with smaller ones on each side. The large room is spacious, and gives every opportunity for viewing the pictures from different positions. In the center of the room has been placed a number of busts of well-known men by Mr. Hamilton McCarthy. Three pictures belonging to the Marquis of Lansdowne, which he kindly lent to the Academy for this Exhibition, have also been placed near the center of the room. The arrangements, taken altogether, are good for the exhibition of the pictures. The entrance to the Exhibition could not be worse, and until lately no attempt was made to inform people of its location. When residents of the city are unable to find the exhibition, how are strangers to discover its whereabouts?" Some effort should be made to make the entrance more convenient.

A very decided improvement in the pictures exhibited is noticeable over those of the last Exhibition held here. It is very gratifying to Canadians to observe the marked advancement which has been made by Canadian artists in the past few years. It is to be hoped, that equal, if not greater progress, will be made in the future. This much wished for improvement of art in this country can be very materially advanced if our wealthy classes will spend some of their accumulations in purchasing pictures by our Canadian artists. The pictures are well worth a place in any house, and there is no necessity of buying an inferior picture with the object of rendering assistance to artists. It is more than probable that the purchaser will have received the greater benefit in the higher ideas of life which will be acquired by his surrounding himself and family with works of art, not only beautiful in themselves, but also in the ideas which they suggest. There are very many costly houses in this city which have not upon their walls one single picture worthy of a place in the humblest cottage. Let us hope that this number will be reduced. The influence of an exhibition of good paintings must be very great. People who even for a few moments view a good work must see the great difference between it and that which meets their eyes every day within their houses. If they have any higher feelings it must cause them to strive to obtain that which they admire most. And in this is the great benefit of art exhibitions to the people. They are given opportunities to see good work, and the effect must be more than temporary.

We think it would be a very good thing if the exhibition of paintings were thrown open to the public on one or two evenings. We do not believe that this would result in any loss, but rather the opposite. Even presuming that there should be a small loss, it would be more than counterbalanced by the instruction gained by the public. It is true that these Exhibitions must be managed in such a way as to obtain money, but at the same time they should be made to serve educational purposes. The higher our people as a body are educated in the knowledge of art, the greater will be the progress of art. We certainly are not too highly educated in aesthetics; a little more or even a large amount of instruction in this direction will not advance us beyond safe bounds. Then let everything in reason be done which will advance us as a people in the love of the beautiful. That this Exhibition and Art Fair may result in educating the people as well as in a large financial balance is the hope of everyone.

To secure facility of adaptation in production and design in art workmanship, quick execution should be practised by students. Free-hand drawing and clay sketches should be simply the result of rapid observation, representing what the memory retains of an object after viewing it a certain time. With a definite conception of an example, and without further reference to it, a space should be filled with appropriate decoration in a given time. The Japanese, who have advanced all arts they have adopted, have adopted this plan, which is the education of the eye.

CANADIAN ARCHITECT AND BUILDER COMPETITION.

WE are exceedingly pleased with the result of this competition; eight designs of more than average excellence having been submitted. It was with some doubt that we determined to hold a competition, fearing that there might not be any response on the part of Canadian draughtsmen. The amount of the prizes was not by any means large, and we were somewhat afraid that draughtsmen might not enter a competition for the sake of improvement. That they have done so is very gratifying, and shows that there are among the draughtsmen a few who are desirous of being more than servient preparers of designs at the dictation of ignorant clients. The greater number of clients value an architect in the degree that he will carry out their ideas without protest. An architect who has studied his profession as he should, will have derived much information useful to his client if he will but receive it, and when he refuses, the architect must, if he values his reputation, do his utmost to convince the client of his error.

The designs sent in would meet the requirements of nearly every description of client, and there are others which have been prepared with no little study that would exactly meet the wants of the many. It is our intention to criticize all the plans to the best of our ability, pointing out what we consider defects, and suggesting improvements. We hope by this means to assist draughtsmen who are desirous of learning, by giving them hints on the points to be considered in the planning of houses. In another column will be found a criticism of the design placed first by the experts.

We believe that a large number of the designs came from a single office in this city, and that six out of the eight prizes were taken by students of that office. This speaks very highly of the *esprit de corps*, among those students, and where there is so much rivalry there must necessarily be progress.

Those who sent in designs and did not get a position, or who only received a low one, must not become discouraged. They have now some knowledge of where they stand in competition with others, and will be able to study with some knowledge of their deficiencies.

We will illustrate a number of the designs sent in, so that the defeated may see wherein they failed, and also what secured success.

It is our intention to hold another competition later on, when the work in the different offices is not so pressing as at the present time. Ample notice will be given to allow of careful study, and we expect to have a more thorough and instructive competition than the one just held, successful as it has been.

Another pleasing feature of the competition, and one which we were nearly forgetting, was that designs were sent in from long distances, one coming from Prince Edward Island. We hope to welcome in our next competition designs from all parts of Canada.

The Committee appointed by the Architectural Guild of Toronto to adjudge the prizes offered by the CANADIAN ARCHITECT AND BUILDER for the best design for a town house costing $2,500, beg to submit the follwing report:—

We find for excellence of plan and elevation, and for due regard to the limitation of price, the following five names most successful in order of merit, as follows:

1. "Dessir a Teur," (John C. B. Howard, Toronto).
2. "Nevis," (E. Wilby, Toronto).
3. "Solaria," (C. B. Chappel, Charlottetown, P. E. I).
4. "Gamut," (C. H. Acton Bond, Toronto).
5. "Deux Mille Cinq Cent," (Chas. E. Langley, Toronto).

For skill in rendering the perspective drawing, we consider the four most excellent to be the following, placed in order of merit:

1. "Dessir a Teur."
2. "D. R. B." (David R. Brown, Montreal).
3. "Nevis."
4. "Gamut."

WILLIAM G. STORM.
EDMUND BURKE.
W. A. LANGTON.

Toronto, 1st May, 1888.

SHORT DESCRIPTION OF DESIGN FOR A $2,500 TOWN HOUSE BY "DESSIR A TEUR."

This design has for its first object, simplicity in both plan and elevations. The rooms have been planned with the view of obtaining the mellow rays of the morning sun. The entrances are so arranged as to be free from the effects of snow slides, &c., from the roof, which to "Dessir a Teur" is a very important point in this climate. By combining the stair-cases—which seems permissable in a house of this cost, for generally a client of such means expects a house half as large again as can be built for his expenditure—a saving of both space and money is effected. The convenience of a wide stair from laundry, &c., to the garden is also to be noted.

Materials.—Outside cellar walls to be of stone, interior walls of 9 inch brick. Timber of good dry and clear white pine. The structure above the cellar walls will be of frame; the exterior walls to be covered, both sides, with matched sheeting and felt; battened and lathed and plastered inside, and first storey outside covered with clapboards, and second storey and gables with cut shingles; roof to be laid with shingles on mortar. All of work is to be painted excepting the two ground floor rooms, which will be of best varnished pine. All shingle work to be untouched to turn grey with the weather. This design cubes at 8c., the amount stated.

CONSTRUCTION OF ROOFS.

ARCHITECT S. G. Curry gave a very instructive address on the "Construction of Roofs," before the Toronto Architectural Draughtsmen's Association on Tuesday evening, April 17th. The subject of roof coverings, the merits of various kinds, and how some of the difficulties are to be met in obtaining a weather-tight roof, particularly where ice and snow have to be contended with, was first taken up, after which Mr. Curry dealt with the construction of trusses, dwelling on the importance of having the main points "fixed" to secure perfect rigidity. The address was concluded by an explanation of Ricker's system of graphic statics for the calculation of strains, illustrated by diagrams. Mr. Curry, who has always shown a practical interest in the Association, was accorded a hearty vote of thanks at the close for his able and instructive address.

OUR ILLUSTRATIONS.

ONE of the illustrations in this number is the design sent in in the CANADIAN ARCHITECT AND BUILDER competition by "Dessir a Teur." The design was placed first by the committee of experts appointed by the Architectural Guild, a position to which it most deservedly is entitled. The author has given time and study without stint, and has conceived a plan which is almost without a fault. He has placed the dining room in its proper position, having an eastern exposure, which will allow of the breakfast hour being brightened by the rays of the morning sun. Again, the dinner has not to be partaken of in the summer months in a room heated to a most uncomfortable temperature by the afternoon sun. The serving pantry is not large, but it is ample for the size of the house, and the store closet is a very valuable addition. The kitchen is well placed, and is not rendered useless by the number or positions of the doors. A kitchen closet would have been a decided advantage, and would have improved this design, but everything is not attainable with a limited expenditure. The open porch to kitchen is a clever arrangement, which in winter could be taken advantage of by placing an outside door with a glass sash above it across the opening, thus shutting out a large amount of cold. The parlor is very satisfactory, and has a pleasant bay window with a southern exposure. The entrance is well managed, with a fair-sized vestibule and open porch. The staircase hall is small, but sufficient, and well proportioned. The sliding doors allow of the space being made the most of in the hall and rooms. The main staircase and servants' stairs have been most cleverly managed.

The ground floor is practically perfect; we cannot see how it could be improved in a single respect. The first floor is also well planned, the rooms being of good size, well placed, and with sufficient closet accommodation. A linen room has been supplied which is complete in all respects. This room is a very necessary one, but is not often provided in small houses. We prefer a bath room with an east or south exposure; but as this plan is so perfect we cannot find fault with its position, as to have given it any other place would have ruined a very superior plan without sufficient reason.

The elevations are all that could be desired; they are artistic, simple and pleasing. The broad and simple roof assists the design immensely, and gives it a simple dignity which is highly satisfactory. The elevations are carefully drawn, and the perspective is artistically treated.

We must compliment the author on his design. We do not remember ever seeing one which has pleased us more, or with which it was possible to find so little fault. If we were building a house of this size, we should instruct the architect to proceed on the plans without an alteration either in plan or elevation. If the author in the future does work equal to what he has shown himself capable of doing at the present time, his success as an architect is assured. He may occasionally find it difficult to convince his clients, through their inability to appreciate good planning and artistic work.

CHURCH OF ST. SIMONS, ROSEDALE, TORONTO.

The exterior of the building is of red brick; with Credit Valley stone coursing and dressings; the upper part of half timbered work filled in with Credit Valley broken stone fillings; the gables and exterior work of choir is finished in tiling, and the entire work finished in deep tones of reds and greens.

The interior of nave is furnished with a brick dado, the walls and ceilings being of trowelled stucco, decorated. The ceilings and walls of choir, baptistry and chancel are elaborately decorated in colors and bronzes. The furniture of the nave and church is of ash brought to a dark rich color.

Cost of the entire building, including heating and furnishing, $10,000.

Messrs. Strickland & Symons designed and superintended the construction of the building. Davidson & Kelly executed the carpenter work, and Elliott & Son the decorative work.

TORONTO ARCHITECTURAL GUILD.

THE regular monthly dinner of the Architectural Guild took place on Thursday evening last. The attendance, though not large, was more than made up by the enthusiasm of the members present.

A vote of thanks was unanimously passed to Mr. Bain, of the public library, for his kindness in receiving the members of the Guild on April 12th, for the arrangements he had made to show the valuable collection of works on architecture which the library contains, for his special invitation to the members to make use of the library for reference purposes to the freest possible extent.

It was decided to institute a series of competitions on architectural subjects, for competition among the students in the offices of members of the Guild—the first competition to be measured drawings of a public doorway to be selected by the Executive Committee. Other competitions will follow.

A committee was appointed to report on the question of some regular method of articleing students in architecture, and also to determine if it is possible to enforce some standard of educational qualification.

An informal discussion took place on the proposed conditions of the Board of Trade competition. General satisfaction was expressed at the possibility of having a first-class competition, conducted on principles which must result beneficially to the Board of Trade and also to the architectural profession.

Notice was given that at the annual meeting in January a motion to amend the constitution would be made as follows: "That the membership of any member of this Guild shall lapse, 1st, when he does not pay his annual fee on or before the 1st day of April in each year, and 2nd, when he has not attended 60 per cent. of the regular meetings of the Guild without good and sufficient cause, viz., illness, or prolonged absence from the city."

THE PROPOSED NEW TORONTO EXCHANGE BUILDING.

WE are pleased to learn that the Building Committee of the Board of Trade have determined to have an open competition of designs for their proposed new building. They very wisely asked the assistance of the Architectural Guild in the preparation of the conditions of the competition. The conditions are now under consideration, and will, from present appearance, be very liberal and fair in their construction. In the past, very few of our best architects have entered competitions, because the conditions were such that few men could afford to risk their time, money and reputation on what to a certainty would be decided by favoritism. Nearly all the best architects have signified their intention to enter this competition, and we feel confident that they will not run far behind in the race, even though they should have strong foreign competition.

We are also pleased to find that there are men in this

community who believe that it is only right to give local talent a fair opportunity to show what it can do. That such opportunity has been given in the last few years, no one who knows the facts will affirm. The erection of the Ontario Parliament Buildings was taken out of the hands of capable local talent, which was first placed in competition with firms from the United States, and given into the hands of the expert, who condemned the plans of Canadians without just or sufficient reasons.

Canadian talent has succeeded in competition with the local element in the United States; why cannot it do the same at home? Is it that a "prophet is not without honor save in his own country?" We are afraid that it must be so. We hear a great deal said about building up a "national spirit." How is this to be done when it is impossible for young men of talent to receive the reward to which they are entitled in their native country?

We would advise our architects to "put their best foot forward," and show that they have the ability to reach the top rung in the ladder of fame at home, as well as in a foreign country.

A model of the memorial statue to be erected at Port Hope to the memory of the late Col. Williams, has been prepared by Mr. Hamilton McCarthy, of this city, and has been approved of by a committee appointed by the Williams Memorial Association. The statue will be in bronze, of heroic size, mounted on a grey granite pedestal twelve feet high. It represents the Colonel with upraised sword giving the word of command.

The London *Free Press* is of opinion that Canadian architects should turn their attention to designing houses in such a manner that the roofs could be utilized for recreation resorts by the occupants. Canada is a very large country, with a comparatively small population. There is as yet—nor is there likely to be for a century hence—no scarcity of fresh air or means of recreation for all requirements. Our contemporary could easily find some subject of more practical interest to discourse upon.

FLOWER-BEDS ON THE LAWN.

THE house is not wanted to stand in a flower-garden where everything else is sacrificed for the sake of a gorgeous display of gay colors. Besides, says the *Building Budget*, a bed of choice flowers look far more beautiful when standing well separated from other similar objects, either near the border of the walk or on the well-trimmed lawn where a group of dark foliage as a background gives relief to the bright and gay colors. Here they attract attention, while in the masses, the singles are lost. Too many flower-beds interfere with the effect of what is a more important feature on the limited surrounding of a suburban home, and that is the lawn, which should predominate. We introduce flowers not only for their individual beauty and enjoyment, but also for picturesque effects in connection with the house, and an adjunct to the lawn scenery, and effect. Such arrangements, beside producing great satisfaction to the occupants of a country home, add much to the cultivation of good taste; for few will pass by such a homestead without a pleasing reflection, and perhaps a desire to imitate similar effects on their own grounds. At a small outlay of money we can procure from most every nursery what is needed for such purposes. In fact, we can always find a desirable place for an evergreen or a shade tree near a dwelling.

TESTING FOR FOUNDATIONS.

IN connection with the building for the Paris Exhibition, a series of experiments have recently been carried out at the Champ de Mars, with a view to determine the resistence of the soil to concentrated loads, and in this way check the dimensions to be given to the foundations in different cases. A perfectly level surface in the form of a square of 118 feet side was first prepared, on which were placed four rectangular cast-iron blocks 1 foot 8 inches square, disposed so as to occupy the corner of a square, the distance apart being 11 feet 8 inches centre to centre, and these spaces were bridged by girders constructed of I irons. These girders were next loaded with T irons, the number and weight of which were carefully noted. At the end of 11 hours the weight on the girders had reached a total of 143,923 pounds, and indications of settlement became visible, the stress on the surface of the ground being at this moment 7,311 tons per square foot, in which is included the weight of the blocks and girders in addition to the above load. The experiment was then abandoned till the following day, when it was found that the settlement had increased during the night to an amount varying between 10¾ inches and 11 inches. The experiment was now resumed and the load increased up to 202,776 pounds, at which the experiment was abandoned, as some of the blocks had then sunk completely out of sight, leaving the girders to be supported directly on the surface of the soil. The conclusions arrived at were that the ground at this spot is capable of resisting a load equivalent to 5.43 tons per square foot, that a certain amount of settlement may be expected when the stress reaches 7.31 tons per square foot, and that it is totally incapable of bearing a load amounting to 8.14 tons per square foot

MADISON AVENUE SEWER.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—I wish you could stir up the authorities who are responsible for the tardy progress of Madison Avenue sewer, Toronto. The tenders for the work have been let long enough ago, and other streets that did not require sewers as badly have since then been accommodated. I am building there now, and would have built there a year ago, as would many others, if sewer, &c., had been in. I do not now suppose the block pavement will be down for another year.

Yours truly,

ONE INTERESTED.

ROBURITE.

UNDER the heading of "Hydro Carbon Explosives," the Midland Institute of Mining Engineers, in Great Britain have had presented to them valuable information and research into this new explosive. It is one of the group of explosives invented by Spreagel, a German, who claims for it less light in explosion, and greater force than any of the other explosives. Its composition is given, thus: Roburite—chloro-dinitro—benzol—$C_6H_3Cl(No\ 2)_2$ in which 3 atoms of hydrogen have been replaced by 7 atom of chlorine and 2 molecules of nitric peroxide (No. 2.) It has theoretically nine times the force of gunpowder, but practically it may be taken at 4-1 compared with powder.

The research carried out by several members, was with a view to ascertain how much flame was developed during explosion, a point of the highest importance in underground and mining work, where so much explosive matter is always present. In one series of experiments, coal gas was passed into a receiver containing 72 cubic feet, and contained an explosive mixture of 8 per cent. of gas to 92 of air. Roburite was fired in this apparatus several times without igniting the gas. With powder a violent explosion accompanied by large quantities of flame occurred. In a series of surface experiments, the most valuable was firing roburite in an old boiler shell, in which coal dust was kept in suspension by means of a fan. No ignition of the coal dust took place. In pit experiments, like results were obtained, and in one special case, a 2 in. hole 4 ft. 6 in. deep, charged with 105 grammes, a space of 2 feet was left between the charge and the tamping. A loud report was heard, the explosion was successful, no flame or spark could be perceived, nor was any inconvenience caused by the flames, even instantly after the explosion. The most surprising experiments were perhaps those made by a member of the Institute, who fired loose roburite (1) in an atmosphere of 1 oz. of coal gas to 8 oz. air, (2) under a layer of gunpower, (3) under a layer of gunpowder and fine coal dust mixed together, without an explosion taking place. Gunpowder fired under the conditions of No. 3 gave violent explosion and long tongue of flame.

As to the cost, from its increased power it appears to be as cheap as using powder. It does not seem to suffer in strength from being damped, its affinity for moisture is not stated beyond the expression that it ought to be kept in a dry place the same as gunpowder. If it succeeds in the English coal pits, we shall probably hear of it before long on this continent.

STEEL VERSUS WROUGHT IRON FOR BUILDING PURPOSES.

MR. C. L. STROBEL, Member of the American Society o Civil Engineers, gives the following opinion on the above subject which we find printed in the *Engineering & Building Record*: "I have read the article 'Steel versus Wrought Iron for Building Purposes' in the issue of March 17, and you are undoubtedly correct in the position you have taken. There is one element of economy, however, in favor of steel beams which was not mentioned. The lightest weight of 15-inch iron beams is 50 pounds per foot; whereas 15-inch steel beams are furnished weighing 32 pounds. The lightest weight of 12-inch iron beams is 42 pounds per foot; whereas 12-inch steel beams are furnished weighing 32 pounds, etc. If, therefore, a 12-inch 42-pound iron beam is required to carry a certain load, a 15-inch 41-pound steel beam can be substituted for it, giving not only greater strength, but much less deflection as well.

"The rolling of these light sections in iron is difficult and not very satisfactory.

"In connection with the question of safety of metal constructions for buildings, I wish to call your attention to the general use of cast iron for columns. Formerly loads carried by columns were generally light, and the section provided much in excess of the requirements. Of late, however, columns have assumed a much more important function in buildings. For high office buildings, warehouses, apartment houses, etc., the columns practically carry all the weight of the different floors in the building. The walls serve in many cases simply to fill in and form the outer shell for the building. The factor of safety used is sometimes as low as 6. Practically no tests are made on cast-iron as to quality. The columns are cast on their side, not on one end as is usually called for in the case of water-pipe. The result is that in many cases the columns are very thin on one side and excessively thick on the other. Cast-iron struts taken out of old bridges show plainly how very unreliable castings are when made in this way. It is true that in buildings the loads are quiescent, but this does not improve matters much. A further consideration that should not be lost sight of is that the loads carried by the columns are almost invariably eccentric, so that cross strains are added to the direct compressive strains, thereby largely reducing the factor of safety."

BUILDING CONTRACTS.

A GOOD deal of discussion is going on just new about forms of building contract. The National Association of Master-Builders' seems to have opened the discussion, a year ago or more, by the appointment of a committee to consider the subject of drawing up a model building-contract to be officially adopted by the Association, but the matter has occupied the attention of various bodies of architects as well as builders, and as the Committee of the Builders' Association was sensible enough to invite a few architects to join in its deliberations the subject may fairly be said to be formally before the two professions. For our own part, we are inclined to think that the proper position for architects to maintain, unless applied to for advice by the builders, is that of critics, rather than promotors of any particular form. After all, the contract is between the owner and builder, not between the builder and the architect. It is the duty of architects to guard the interest of owners in contracts, so far as they can fairly do so, and they should, both individually and collectively, carefully avoid the appearance of going out of their way to invent forms of contract which may be more acceptable to builders than those now in use. If the builders object to the current forms they are at liberty to say what changes they wish to have made, and if they unanimously resolve to insist upon any stipulation whatever, the owners must submit, and the architects, if their powers of persuasion prove unavailing, have no further responsibility on that particular point. So far as the architects' own comfort is concerned, most of them would be glad to see an unchangeable form of contract adopted, covering all conceivable points, which would relieve them of the anxiety of drawing up contracts in their own way, but until the matter has gone beyond discussion, they should, as a class, fee themselves, to some extent, entrusted with the duty of defending the rights of owners in general. At the last convention of the Association of Master Builders, certain rules were drawn up, and recommended to local societies for adoption, which have already been printed at length in these columns; and the Canadian builders have recently adopted a form of contract prepared for them, and, it is said, will now refuse to sign any other.

In some respects the Canadian form is more favorable to the owner than the rules of the American Association. The Canadian contract, for example, provides as do most existing contracts on this side the line, that specifications and drawings shall be regarded as co-operating, so that work shown on one and not on the other shall be included as if mentioned in both, while the American rules provide that demands made by the plans, and not referred to in the specification, shall not be considered in the estimate offered. In our opinion the Canadian form is in this respect the only fair one. No architect in this or any other country can describe a building completely either by specifications or plans alone. Both sorts of documents together are barely enough to enable the most careful architect to show all the items which he wishes to include in the contract, as so long as both plans and specifications are open to the builker to study in making his estimate, there is no more reason for his leaving out anything shown on one because it is not mentioned in the other than there would be for omitting the items on certain pages of the specification. If the plans and specifications do not agree, the architect is ready to decide which shall be followed in estimating, and to make a note of his decision, so that with reasonable care on the part of the builder, such as contractors' associations should endeavor to inculcate, there is no chance of misunderstanding under the Canadian form, while the American rule opens the door to all sorts of extras, quarrels and dissatisfaction. Again, by the Canadian contract the builder is not allowed to sub-let the whole or any portion of the contract without the written consent of the architect, while the Americans stipulate that the contractor shall not be restricted as to whom he employs as sub-contractor unless previously notified. It is not quite clear whether the American rule requires that the architect shall notify the contractor not to employ certain persons, or to obtain his consent to sub-contractors. If it means the latter, the stipulation does not change the ordinary form; if the former, every architect is to be obliged to lay himself open to a dozen libel suits, if he wishss to protect his client against the transfer of his contract from a good builder to a bad one, and is even then liable to see some strange rascal from a neighboring town substituted for a careful and responsible builder whom he had persuaded the owner to contract with at an extra price, for the sake of getting his work well done. In regard to forfeiture for delay, the Canadian contract provides that where delay occurs by reason of inelemency of weather, or strikes of particular trades, the architect shall extend the time of completion to a reasonable amount. The American rules say nothing about allowance of extra time for completion in case of special circumstances, but content themselves with the rather childish demand that where a penalty is to be exacted from the builder for delay beyond a certain date, a premium of like amount shall be paid to the builder if he completes his work before the given date. It ought to be obvious enough that if an owner has, for example, given a lease of the house he proposes to build from a certain date, as often happens, or if he has arranged to give up his present residence on a fixed day, and move into his new one, he has a right to be compensated for any damage he may suffer through the failure of the builder to keep the promise he has voluntarily made; while, as it is of no advantage to him to have the house on his hands before the time at which he or his tenant is ready to move into it, but rather an injury, since a house hurried in building is never so good as one constructed deliberately, there is no reason whatever why he should pay a builder a premium for encumbering him, before the stipulated time, with a building that he has no use for, and is, through the haste with which it was built, of less value than he intended and agreed to have it. Moreover, it should be remembered that the contract in present use, by which an allowance of time is made to the contractor in case of strikes or unusually bad weather, protects the interest of the contractor against the workmen at the cost, and often to the very great inconvenience, of the owner, who makes perfectly definite promises, in return for very elastic ones on the part of the builder. In addition to this concession, all builders and architects can testify that the penalty for delay stipulated in the contract is very rarely enforced. If the fear of it serves its purpose in keeping the contractor nearly to the time of completion to which he has agreed, this is all that is usually required of it, and cases where a builder who has honestly tried to keep his promises has been obliged to suffer for a few days or even weeks delay beyond the contract time of completion of his work are, in our experience, almost unknown. We think that the rights of both parties are better guarded by providing that forfeiture shall not be exacted for delay from causes which in the opinion of the architect could not have been reasonably foreseen or avoided by the contractor than by the Canadian clause, requiring the architect to extend the time of completion in case of strikes or inclement weather; but either is better than to set up, as the American rule will do, a struggle between the owner and the builder, to see who can extort, at the end of the work, most money that he has not earned, and is not justly entitled to, from the other.

One more point that should be carefully considered by all the projectors of improved building contracts is that of arbitration. Most of the old forms of contract, and many of the new ones, provide that disputes between builder and owner shall be settled by two arbitrators, one chosen by each party, who shall choose a third, and the award of a majority of the arbitrators shall be final. At first sight, this method of settling controversies has a certain charm, but to most architects it soon loses its attractiveness, and so good a lawyer as Sir Edmund Beckett denounces it in unmeasured terms. On no account, as he says, should a building contract contain an arbitration clause, which simply commits the owner to the most expensive kind of lawsuit over every trifling affair that the builder may choose to require him to "leave out." Moreover, as a builder's claim in court must be sustained by sworn evidence, subject to severe cross-examination, and to the opinion of the architect, whose testimony generally determines the case, while any sort of story may be palmed off on arbitrators, and an unscrupulous man is more likely to get something awarded to him that he ought not to have by arbitrators than by a jury, the arbitration clause sets a premium on quarrelsomeness and bold falsehood. Fortunately, perhaps, the ordinary arbitration clause in a building contract is not binding. The rule is that an agreement between two persons to "oust the courts of their jurisdiction" is void, as contrary to public policy, and until the award of the arbitrators is made, either party can refuse to be bound by it, and apply to the courts. After it is made, however, under ordinary circumstances, there is no appeal.—*American Architect and Building News.*

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

JUST before the advent of spring the prospect of a busy building season was fully commented on—it seemed a foregone conclusion that there would be quite a rush of work. Then the brick makers, lime burners and lumber dealers, in their active preparations to meet pressing requisitions, made the usual increase in the price of building materials. The mechanics and laborers, after their long winter rest, were eager to commence operations. The architects were busy preparing plans for contemplated new work, which, with that remaining unfinished from last year, reasonably justified the prevailing opinion that the building record of the "Ambitious City" for 1888 would surpass that of last year, and that there would be plenty of work for all hands at the same rate of wages. With such a prospect in view general satisfaction prevailed. But unfortunately, the usual discord and strife among the unions stopped all work, and although a settlement has been made between the Builders' Exchange and the workmen by the unions waving their unreasonable demands, still the strike has had a bad effect, and has damped the ardor of those about to build. Consequently there is very little work in progress now, compared with what there would have been had no such strike occurred. The building public seem to have taken a comprehensive view of the situation, for the estimates for the work that has been tendered on so far have been greatly in excess of last year—so much so, that few contracts have been let up to the present time, but we hope for the best, and if no further disruption takes place this work may be again estimated on and proceeded with, and the balance of the season may be a very busy one indeed.

Following is the record of the buildings for which permits have been issued up to May 4th by the building inspector as taken from the books in his office, but as I have previously remarked this record is not by any means a correct statement of all the buildings in course of erection, as the builders not being under any pecuniary obligation so to do, neglect to make the required entries:—Mr. Y Stewart, 2 brick dwellings on York street; Mr. Milne, 2 new plate glass fronts, corner of James and Rebecca streets; Mr. Thomas, 6 dwelling houses on Bruce street; Dr. Farwell, 3 dwelling houses on Napier street; Mr. Taylor, 1 dwelling house on Emerald street; Mr. Warwick, 1 dwelling house on McGee street; Dr. James, 1 dwelling house, Vine street; 1 dwelling house, Napier street; Mr. Brooks, 3 dwelling houses, York street, between Hep and Caroline streets; Mr. Peene, 2 dwelling houses, Charles street; J. Bell, new plate glass front, 117 Rebecca street; Mallock & Gibson, 2 brick stores on Bay street south; Mr. Hamilton, 1 dwelling house on East Avenue; Mr. Davis, 1 2-storey factory at 136 Catharine street; Mr. Martin, 2 stores on James street north.

The building of our new city hall has commenced, but is retarded by the action of the labor unions. Matters are now being settled, however, and it will be pushed on with energy. The plan for the proposed new Y. M. C. A. building are being prepared, the required amount for the erection of the same having been already subscribed, and as soon as the site is secured the plans will be submitted for tendering on.

The old clock factory here has been purchased by Wright & Company, of this city, who purpose making extensive alterations in and additions to the present building.

It is very gratifying to see the great change for the better that has taken place in the construction of the modern tenement houses in this city, and I presume the same can be said for all other cities in the Province. Old buildings are being remodelled with sanitary and other improvements, and additions made to them so as to bring them up as much as possible to the present style and requirements, for it is a fact well known to real estate agents that, notwithstanding the respect due to old style architecture, the newly erected houses in the so-called modern style sell at much higher figures in proportion to cost of erection than can be obtained for the more substantially erected buildings of the old style. It is proper and right that it should be so. It is hard to understand why we of the 19th century should regard it as the proper thing to implicitly follow the old style of architecture, either in the erection of our churches, shops or dwelling houses. Hamilton, like other cities, can boast of many very handsome, well designed buildings, and villa residences in the suburbs, but the majority of those erected within the last ten years, especially, are characterized by lack of architectural design in exterior appearance or internal arrangement. The lamentable state of things exists owing to the fact that parties about to build do not understand the value of having their plans prepared by duly qualified architects, and the construction carried out under their superintendence, but on the contrary they submit their ideas to a carpenter or bricklayer who prepares a plan according to his own "practical knowledge," you know, which he submits with his estimate of cost of erection, coupled with the assurance that by the adoption of the same the services of an architect can be dispensed with and his fees saved. It is to be hoped that this penny wise and pound foolish idea will be soon dissipated and better judgment prevail.

There have been a number of dwelling houses erected here within the last few years to be sold on the progressive payment system, and most of them have been so disposed of, but this mode of proprietoriety is falling into disrepute. At first sight the idea is plausible enough, but then the gild wears off after the first few years. When consideration is given to the actual cost after all is paid, the possibility of inability to make the regular payments and consequently the probability of losing all that has been paid as well as all title or right to the estate—such reasoning has very prudently decided the people to first obtain possession of a lot, then borrow the money on mortgage at a face rate of interest, and contract for the erection of their home at the lowest cost,—when, with a reasonable rental, the principal and interest could be paid off in from ten to fifteen yearly instalments. Probably more than half of the dwelling houses now being built are done in this way.

Quite a number of tenement houses would also be erected here if the end would justify the means—that is to say, if the rent received would pay eight per cent. on the outlay after deducting for taxes, and providing a sinking fund of 1 per cent. for wear and usage. The question arises, can this fair investment be made under the existing order of things? The population of our cities is increasing, and dwellings must be had for them, but although workingmen's wages have largely increased within the last few years, the parties so benefitted show no disposition to pay higher rent for their homes.

MONTREAL.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

ANYONE arriving in the city at this time would be impressed immediately with the fact that an extensive building boom had struck the city. Work is being pushed forward in all parts of the city, and St. James street, the principal thoroughfare, is quite a transformation scene, for on this street alone there are at least eighteen new fronts in construction, and this, with five imposing edifices, will make St. James the finest street in the Dominion.

The Molson property is to be remodelled at a cost of $20,000 by Messrs. Rice, Shapley & Co. The architecture will be of the Elizabethan order. Mr. J. J. Brown is the architect.

Plans will be asked for the new Young Men's Christian Association building on Dominion Square next month. The present building on Victoria Square is for sale.

The dismantling of the old offices of the Canadian Pacific Railway has been commenced. The foundations have been examined by Mr. C. Clinton, of New York, the architect who is superintending the work for the Imperial Life. It is found necessary to take down the two wings, and then the foundations would not be strong enough for the extra weigh which is to be added.

The impression that the cost of building is greater this year than usual has somehow gained growth among intending investors, and statements to this effect have been made in the papers here. During the winter mechanics and laborers were asking for higher wages, and many capitalists held off, but this does not apply to the present time, and as the men will now take less, it is a fact that the cost of building is actually lower than last year.

WINNIPEG.

(Correspondence CANADIAN ARCHITECT AND BUILDER.

THE architects in this city at present have very little work, but hope that business will improve shortly. There are a few small private houses being built in and around the city, mostly frame. Work has commenced on the new buildings for the General Hospital. Mr. Zindorf, contractor, has a large gang of men at work on the R. R. V. R. bridges. Mr. Loniesse, contractor, has commenced work again on the Selkirk asylum which had stopped for the winter. Tenders are invited for a maternity hospital. Messrs. Timewell & Son, architects, received tenders for a 50,000 bushel elevator at Neepawa, and are preparing plans for one at St. Jean Baptiste on the R. R. V. R. The bricklayers have adopted the 9 hour system and 8 hours on Saturday.

The Salvation Army Barracks at London, Ont., will cost $14,000.

Reports of active building operations come from Peterborough, Ont.

The contract for the new Baptist church at Perth, Ont., has been let to Mr. Ireland.

A closet finished with red cedar shelves and drawers is said to be death to moths and insects.

An investigation into the affairs of the St. John, N. B., Building Society, has revealed a deficit of $66,000.

The Hamilton plasterers have agreed with the employers on a rate of 29 cents per hour for the current season.

The extension of Melville Presbyterian Church, Cote St., Antoine, Que., will cost from $3,500 to $4,000.

The building being erected for the Salvation Army at Stratford, Ont., will be 50 feet wide and 90 feet deep with a stone basement 8 feet. The estimated cost will be about $9,000

The monthly average of buildings erected in Vancouver during the first three months of the present year was 74.

Work has been commenced on the iron bridge across the Welland River at Port Robinson. The cost will be $9,000.

Penetanguishene recently voted $10,000 for harbor improvements; Orillia, $15,000 for waterworks and electric light.

The station and viaduct which the C. P. R. is building at Montreal will cost, apart from the ground required, about $1,500,000.

The plans of Mr. W. J. Smith, architect, Toronto, have been accepted by the Port Hope School Board, for a new school building to cost $18,000.

The town of Port Arthur has decided by a vote of the citizens that it is preferable that the new waterworks system for the town should be constructed and owned by a private company, instead of by the corporation.

A pile driver which was being moved from one point to another in the construction of a new bridge at Sutton, Ont., fell over upon Mr. Myers, father of the contractor, and Mr. Thos. Barker, killing both men instantly.

The following were the successful tenderers for materials to be used in extending the waterworks system of Kingston, Ont:—Cast-iron pipe and special castings, A. Gartsbore, Hamilton; pig-lead, Jas. Robertson, Montreal; hydrants and valves, Stevens & Burns, London. The cost of labor will be about $40,000.

Westminster *Columbian*:—About thirty-five new houses are in course of erection in this city, and plans are being prepared for nearly as many more. The class of buildings now being erected is far superior to the average dwellings which have been erected heretofore, and though rents are higher, nearly every house is leased before finished.

Architect Henri Malingre has forwarded to the railway commission at Ottawa the plans he had been requested to prepare by the town council of Longueuil for the proposed bridge across the river opposite the city. If a favorable opinion is received from the commission a joint stock company will be formed for the construction of the bridge. According to the plans the structure will be a gigantic one and will cost $2,000,000. It will begin on the Montreal side of the river at Point Charles, near Ogilvie's mill, and with a gradual ascent will span the main channel, 60 feet above the low water level, and with a gradual descent will cross St. Helen's Island ending on the Government common on the south shore above the town of Longueuil. It will be constructed of iron and will be wider than the Brooklyn bridge, which is 80 feet wide.

THE LUCIGEN LIGHT.

THE Lucigen Light is attracting much attention throughout Europe. The great light giving capacity of this new invention is such that the largest areas may be freely lighted at a merely nominal cost, as the Lucigen is an oil burner.

The inventor started out with the original intention of introducing his light to meet the requirements of railroad construction and other similar work which demanded strong and brilliant illumination, coupled with portability, but it was not long before a thousand and one uses appeared to which this light could be put, and hence its popularity abroad.

It is said that ship owners, whose vessels ply the English channels, intend introducing the Lucigen on their ships, supplanting the red and green light now in common use, and so frequently found to be invisible or deceptive in a slight haze. One or two Lucigens, it is claimed, would light up a ship and the surrounding sea so clearly that the masts, spars and hull of the vessel will be visible for miles; this has been unsuccessfully tried with electricity, but the blinding glare of the electric light was proved to render all but itself invisible; with the Lucigen, the object sought for seems to be entirely possible.

This new light has great diffusive power and broad glow of light, and combined with its extreme simplicity have led to its adoption in all the important engineering and shipbuilding centres in Great Britain. If the reliable reports that we hear, speaking in such glowing terms of this new light, bear the test of practical use, a very important lamp has been discovered.

As colors undergo apparent modification according to their position and the quantity and the direction of the light falling upon them—a color on a horizontal plane, for instance, showing a different hue from that displayed on a perpendicular surface—it is always well before applying colors and tints to walls and ceilings, to attach a sample of the proposed color, painted on the paper, to the surface, this being the only correct way of selecting the most suitable hue or tint.

For a nicely decorated wall, flat the stiles straw color; the inner panel a very faint pearl tint; the band surmounting centre of oval white. Work on the centre painting in colors of natural tints, kept in half tones; corner roses to be worked in deeper shade of straw and heightened white, the line surmounting the oval, a deep straw; and the line on the edge of white margin, gold, outlined with straw color, first line of square panel, straw colnr; middle line, gold; band between the two, a light pearl tint; outer line, a deep pearl tint.

GURNEY HOT WATER HEATING

—) FOR (—

GREEN HOUSE,

PUBLIC BUILDING

AND PRIVATE RESIDENCE.

Saves 20 per cent. in fuel, and is the most perfect working Boiler ever produced.

NOISELESS IN OPERATION,

NO DANGER OF EXPLOSION,

EVEN TEMPERATURE OF HEAT.

We have placed over 2000 of our Boilers during the past three years, and have heard nothing but praise and satisfaction. Below we give

A RECENT TESTIMONIAL:

WOODSTOCK, Feb. 16, 1888.

E. & C. GURNEY CO., TORONTO.

GENTLEMEN,—The No. 32 Hot Water Heater we bought of you for heating our offices is doing splendidly. When it was being put in we frankly admit we had serious doubts if a heater which appeared so small for the duty required of it would warm the offices sufficiently during the severe cold of winter. We are pleased to say, however, that during the days of intense cold through which we have just passed, our offices have been really uncomfortably warm, and this, too, without any forcing of the fire. The consumption of coal has been very light, and we have to express our perfect satisfaction with the heater.

Yours truly,

(Signed) THE PATTERSON BROS. & CO., LTD.

—: MANUFACTURED BY :—

THE E. & C. GURNEY CO., LTD.

TORONTO, - HAMILTON, - MONTREAL, - WINNIPEG.

GURNEY HOT WATER HEATER CO., Boston.

For sale by all the leading Fitters. Send for our book of testimonials, and illustrated description.

AIKENHEAD & CROMBIE,

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BUILDERS' HARDWARE.

AGENTS FOR

Hopkins & Dickinson,	*Bronze Goods,* - -	*New York.*
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Norton Door Check and Spring,	- -	*New York.*

Write for Catalogue of above Goods. Estimates given on Special Hardware by any Architect.

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THOROLD HYDRAULIC CEMENT MILLS

JOHN BATTLE, Proprietor,

THOROLD, - - ONTARIO.

OTTAWA, 7th June, 1884.

DEAR SIR,—I duly received your letter of the 1st ultimo, requesting my opinion relative to the Cement manufactured at your establishment in Thorold, in reference to which the following is respectfully submitted: For the past *forty years* the natural Hydraulic Cement obtained at Thorold, Province of Ontario, has been used to my knowledge, on various extensive public works, and in every instance the result has proved highly satisfactory. When properly burned, ground fine, and used fresh from the mill, it will compare favorably with any natural or artificial cemeot that I know of for building or other purposes in a moist position, or for walls that have been built a few weeks before water has been let in oo them. It is well adopted for concrete foundations, walls, drains, cisterns, or indeed, for any hydraulic works; when properly prepared and mixed with two parts of clean sharp sand to one of cement, the result will invariably give good satisfaction.

I am, sir, yours very truly,

JOHN BATTLE, Esq., JOHN PAGE,
Cement Manufacturer, etc., Thorold, Ont. Chief Engineer of Canals, Canada.

QUEBEC, MONTREAL, OTTAWA & OCCIDENTAL RAILWAY.
CHIEF ENGINEER'S OFFICE,

MONTREAL, 31st March, 1881.

JOHN BATTLE, Esq., Thorold:

DEAR SIR,—I have tested with Reible's Testing Machine the tensile strength of six blocks made from the barrel of Thorold Hydraulic Cement which you sent me last summer. The blocks were made of neat cement, and were 1½ inches square at the smallest part. Four of them were kept 23 days in air, and only broke under the following weights: No. 1, 420 lbs.; No. 2, 470 lbs.; No. 3, 436 lbs.; No. 4, 420 lbs.; averaging 437 lbs. each, or 194 lbs. per square inch. The remaining two were kept one day in air and forty-seven in water, and broke under the following weights: No. 5, 420 lbs.; No. 6, 450 lbs.; averaging 435 lbs. each, or 193 lbs. per square inch.

Yours truly, P. A. PETERSON,
Chief Engineer,
Quebec, Montreal, Ottawa & Occidental Railway.

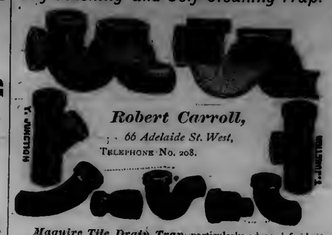
The THOROLD CEMENT is sold by the following dealers:

Toronto.—*Edward Terry, 25 George St.*
" *Robert Carroll, 66 Adelaide St. West.*
" *Joseph Adamson, Esplanade, foot of George St.*

Hamilton.—*W. A. Freeman, James St.*
" *W. J. F. Gordon, James St.*

London.—*A. D. Cameron, Burwell St.*
" *Bowman & Co., 246 Bathurst St.*

MAGUIRE'S Ventilating Self-Flushing and Self-Cleaning Trap.



Robert Carroll,
66 Adelaide St. West,
TELEPHONE No. 208.

Maguire Tile Drain Trap, particularly adapted for house drainage and overhead sewer ventilation. The only reliable self-cleaning Trap in the market. Owing to the fact that the outlet C is below the inlet A, and formed as shown, any liquid or solid matter entering the Trap B must, when it once reaches the top of seal D, flow over and fall clear into the outlet C, not only increases the velocity of the flow of the water and solid matter through the Trap B by creating a fall from the said Trap, but it is also so shaped that it effectually prevents any backwash through the outlet C into the trap B.

Sewer Pipe,
Chimney Tops,
Fire Brick,
Fire Clay,

PORTLAND
—AND—
THOROLD CEMENTS
always on hand.

TELEPHONE 491.

-- Joseph Adamson, --

Esplanade, foot of George Street, TORONTO.

Block Stone	*Sewer Pipe,*	*Portland Cement,*
Cut Stone,	*Drain Tile,*	*Canadian Cement,*
Building Stone,	*Lake Sand,*	*Keene's Cement,*
Paving Stone,	*Lake Gravel,*	*Plaster Paris,*
Floor and P. Stone,	*Fire Brick,*	*Venetian Red,*
Grindstones,	*Fire Clay,*	*Chimney Tops,*

Lime, etc., etc.

Over 5,000 in use.

THE DUNNING - BOILER,

Patent Wrought Iron or Steel, with Self-Feeding Coal Magazine, is the oldest and best for Low Pressure Steam Heating, and insures a warm house day and night.

MADE AS FOLLOWS: As a Magazine Boiler, which requires attention but once in twenty-four hours; as a Surface Burner, to burn hard or soft coal, wood or coke; as a Hot Water Boiler, for greenhouse and hot water heating; as a Portable Boiler, to be set without brick-work. Also in *Two Sections* to pass through any door where a larger one cannot be used. Made in six patterns, fifty-one sizes. Send for Illustrated Catalogue, with full description and price list.

STEAM KEPT UP CONSTANTLY

LOW PRESSURE STEAM AND HOT WATER HEATING

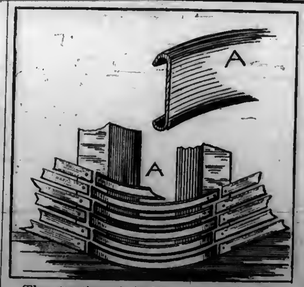
N. B.—Correspondence solicited from Architects and persons building.

HIGH SPEED ECONOMICAL ENGINES AND WOOD-WORKING MACHINERY

For Sash and Door Factories.

SEND FOR CATALOGUE,

WATEROUS ENGINE WORKS CO., - BRANTFORD, CAN.



The attention of Architects and Plasterers is called to this invention.

Give them a trial and be convinced. Send for Circulars and Price List.

RADIGAN'S PATENT

METALLIC LATH.

THE object of this invention is to form circular corners on stud partitions, both outside and inside, when required, or only on the outside. This has hitherto been done by making the grounds with coopers' laths, which, owing to shrinkage, caused the plaster to crack—but curves of any required radius may be made with these Metallic Laths, and which will form a strong and firm ground in line with the wooden lathing for plastering on, and as shown in cut A, the laths are keyed top and bottom, thus forming a double key.

JOHN RADIGAN,

68 Mary Street, - - HAMILTON, ONT.

EXPLOSION OF A DOMESTIC HOT WATER BOILER.

EXPLOSIONS of domestic hot water boilers attached to cooking ranges, water-backs in ranges, etc., through freezing of the pipes in cold weather, are becoming so frequent that it may not be out of place to give an account of one of the most destructive ones that has occurred recently, and point out its cause.

The boiler in question was used in a hotel in a large city in one of the northwestern States, where the temperature is very low at times. It was connected to the kitchen range; the range was a large one, and the heating surface was furnished by a coil of 1½ inch pipe placed near the top, instead of the cast-iron front or back such as is commonly used in the smaller ranges in private dwellings. The connections to the boiler were made in the usual manner; the accompanying cut shows its essential features.

The operation of all boilers of this sort is as follows:

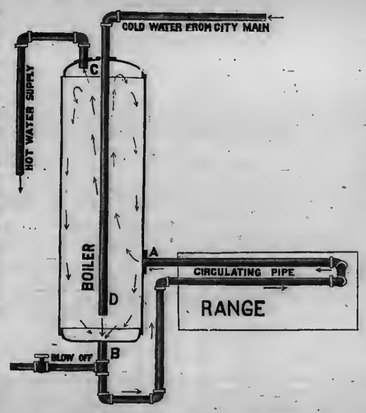
The connections being made as shown in cut, the water is turned on from the main supply and the entire system is filled with water. When it is filled and all outlets are closed, it is evident that no more water can run in, although the boiler is in free connection with and is subjected to the full pressure of the source of supply. When a fire is started in the range, and the water in the circulating pipes or water-back is heated, the water expands, is consequently lighter, and flows out through the pipe into the boiler at A, as this connection is placed higher up than the one at B; this starts the circulation, and the water as it becomes heated constantly flows into the boiler at A, and rises to the upper part of the boiler, while the cooler water at the bottom of the boiler flows out into the circulating pipes at B, and it no water is drawn a slow circulation goes on, as heat is radiated from the boiler, in the direction indicated by the arrows, the water at the top of the boiler always being much hotter than at the bottom. When the hot water cock is opened, cold water instantly begins to flow into the boiler at D, by reason of the pressure on the city main, and forces hot water out of the boiler at C. Thus it will be seen that hot water cannot be drawn unless the cold water inlet is free, and it is equally evident that cold water cannot enter the boiler unless the hot water cock or some other outlet is open.

The above points being understood, we are in a position to investigate the cause of the explosion referred to, which killed one person and badly injured twelve or thirteen others, besides badly damaging the building.

On the morning of the explosion fire was started as usual in the range about 4 o'clock a.m. It was found on trying to draw water that none could be had from either cold or hot water pipes; it was rightly judged that the pipes were frozen. The fire was continued in the range, however, and the breakfast prepared as best it could be, and a plumber sent for to thaw out the pipes. He arrived on the premises about 7 o'clock, as would naturally be the case. He opened both hot and cold water cocks, and getting neither steam nor water, *concluded there was no danger*, and proceeded to thaw out some pipes in the laundry department first. About an hour afterward the explosion occurred. The lower head of the boiler let go, and the main portion of the boiler shot upward like a rocket through the four stories of the hotel and out through the roof.

The coroner held an inquest on the remains of the person killed, and some of the testimony given, as reported in a local paper, would be amusing were it not for the tragic nature of the affair which called it out. The usual expert, with the usual vast and unlimited years of experience, was there, and swore positively to statements which a ten year-old boy who had been a week in the business ought to be ashamed to make. He had examined the wreck with a view to solving the mystery? The matter was as much of a mystery now as it was on the day of the explosion? His theories were exploded as fast as he presented them. The boiler must have been empty. If it had been full of water it could not possibly have exploded, etc., etc. And then a lot more nonsense about the "peculiar" construction of the boiler. As a matter of fact there was nothing peculiar about the boiler or its connections. Everything was precisely like all boilers of this class, of which there are probably hundreds of boilers in daily operation throughout the country, and moreover they were *all right*.

Now let us inquire what caused the explosion. Everything was all right at 8 o'clock the previous evening, for water was drawn at that time. The fire was built in the range at 4 o'clock a.m. It is admitted that the cold water supply pipes were frozen, for no water could be had for kitchen use. It is also proved absolutely that the *hot water supply was frozen or otherwise stopped up*, by the fact that at 7 o'clock the plumber who came to thaw out the pipes opened the hot water cock and got "neither water nor steam." Here was his opportunity to prevent any trouble, but he let it pass. Any one who understood his business would have known that there must have been a tremendous pressure in the boiler at this time, as the range had been fired steadily for three hours; there was about eight square feet of heating surface exposed to the fire by the circulating pipe in the range, and there had been no outlet for the great pressure which must have been generated during this three hours' firing. The blow-off cock should have been tried at once; if this were clear, and the probability is, from its proximity to the range, that it was clear, the pressure could have been relieved and the disaster averted. If the blow-off proved to be stopped up, then the fire should have been at once taken out of the range. At the time the plumber opened the cocks connecting with the boiler, it probably was under a pressure of four or five hundred pounds per square inch. An ordinary cast-iron water-back such as is used in small ranges in private houses, would have exploded shortly after the fire was built, but it will be noticed that the heating surface in this case was furnished by a coil of 1½ inch pipe; this was very strong, and the boiler was the first thing to give way, simply because it was the weakest part of the system.



Accidents of this sort can be easily avoided by exercising a little intelligence and care. The hot water cock should always be opened the first thing on entering the kitchen every cold morning. If the water flows freely, fire may then be started in the range without danger. If it does *not* flow freely, don't build a fire until it *does*.—*The Locomotive.*

SANITARY CONDITION OF TORONTO.

THE Toronto City Commissioner had inserted in the daily papers recently a statement that all the streets and lanes in the city had been cleaned, and that he would be much obliged to any citizen who would inform him of streets remaining uncleaned. We were struck on reading the notice with the thoughtfulness of the Commissioner, and his evident desire to honestly fulfil his duties. Accepting his invitation, we began peering into lanes when opportunity offered in our daily walks. We expected to find them as perfectly clean as possible, but in this we were greatly disappointed. Many, it is true, had been cleaned, but what a number had not been touched! It was also noticed, whenever investigation was carried far enough, that many lanes leading out of other lanes were filthy from end to end, and that nearly all the cleaning had been done in those opening into important streets.

If it is unavoidable that the citizens must put up with dirty lanes throughout the winter months, they should certainly have the benefit of clean ones during the summer. Dirt should be removed for the sake of cleanliness, but much more because it is the cause of disease. There is too much apathy on the part of the people on all sanitary questions. If it is only some one else who is ill, we do not concern ourselves, but when *we* are ill, we look at things very differently. In the one case, we call for economy and condemn extravagance; in the other we affirm that economy is criminal when the exercise of it results in injury to ourselves.

The authorities of this city are so economical that they cannot afford to erect a garbage crematory; but deposit in all the low lying places in the city filth which should be completely destroyed by fire. What the result of this mode of proceeding may be cannot be definitely stated, but of one thing we can be assured—that many of the future inhabitants of this city will be ill when they need not have been, and many will be laid in their last resting place before their time, because of the false notions of economy entertained by our governing bodies.

VENTILATION AND DISEASE.

The following recommendations formed the substance of a report on the subject of ventilation presented by a Committee of the Provincial Board of Health of Ontario, at the meeting held in this city a fortnight ago:—1st, that the sputa of consumptive patients, wherever it is possible to have it so, be received into suitable vessels containing a disinfectant and as soon as possible disposed of by fire; 2nd, that the freest possible ventilation of rooms occupied by consumptive patients be always and in every case secured, and in order to accomplish this result that (*a*) a minimum space of 1,000 cubic feet should be allowed to each occupant of a bedroom, (*b*) superfluous curtains, carpets, furniture, etc., should be forbidden, (*c*) wall paper on bedrooms should also be forbidden; 3rd, that as consumption is the principal cause of death in this province, and the germs of the disease must therefore be widespread, thorough ventilation of public buildings, especially school rooms and dwellings, is strongly recommended; 4th, that sanitation and health resorts in which consumptive patients are brought into close proximity with patients affected with other diseases, more particularly diseases of the air passages, are to be avoided; 5th, that in hospitals tuberculous patients ought to be separated from those affected with other diseases; 6th, that in a private family occupancy of the same bed or even of the same room with a consumptive patient, if consistent with the duties of humanity, be forbidden.

The town of Stratbroy will shortly be lighted by electricity.

J. Harris, plumber, Halifax, N. S., is reported as having assigned.

The streets of St. Thomas will be lighted by electricity for the next three years at a cost of 28 cents per light.

It is recommended that the water supplied to the citizens of Ottawa should be purified by aeration, precipitation and filtration.

The Standard Electric Light Company of Canada, Cookshire, Que., has been incorporated with $25,000 capital stock, for the purpose of manufacturing electric apparatus.

Plumbers are reminded by the *Sanitary News*, that a fortress is no stronger than at its weakest point, therefore, the best job of plumbing with a little leak is hardly better than a botch.

The Medical Health Officer, City Engineer and representatives of the City Council of London, Ont., have had a conference with the Provincial Board of Health regarding the best method of disposing of sewage.

The water supply of St. Johns, Que., has been declared impure and unwholesome. The water from the Richelieu is good if taken at the proper point and led to the town in such a manner that contamination would be impossible.

In view of the possible danger from Asiatic cholera during the approaching summer, it is gratifying to observe the promptitude of the Dominion Government in deciding to make needed improvements at Grosse Isle, for the purpose of perfecting as far as possible our quarantine system, in accordance with the suggestion of the Provincial Boards of Health.

The Master Plumbers' Association of Philadelphia, recommends as a proper test of house drainage, a pressure equal to three pounds to the square inch applied to the soil-pipes or drainage-system in new houses, or to entire new work in old houses before the fixtures are attached or placed in position, and for work with the fixtures attached a pressure equal to "water gauge."

The recommendation of the Medical Health Officer that vendors of milk be required to obtain permits, and submit to having their premises regularly inspected has been adopted by the Toronto Local Board of Health. The necessity for a more careful oversight of milk vendors and their premises formed the subject of comment in these columns recently, and we are pleased to

see that the matter is to be dealt with at once. We believe it could be readily demonstrated that a very arge percentage of cases of infectious disease are due to the impurity of the milk supply in this and other cities.

Five patents have been issued to Elias E. Ries, a Baltimore electrician, for methods and apparatus for heating by electricity. By this system, which is said to be absolutely safe, dwellings can be supplied with heat from central generating stations, by the same conductors that supply the current for the incandescent electric lights. The patents include inventions for private heating from central stations and special methods for heating and lighting railway cars. Patents covering applications for domestic and industrial operations are still pending.

Alum is said to have power to purify water, and even to deprive it of most of the bacteria that it sometimes contains. That muddy water can be cleared by alum has long been known ; but it is a comparatively recent discovery that a very small quantity of alum, so small that it is not injurious to drink the water that contains it, will rid the water of nearly all its bacteria. A Pennsylvania physician found that the water that was drawn by the people of a village where typhoid fever was epidemic was swarming with bacteria. Fifteen drops of it, when spread upon a suitable surface, were capable of forming 8,100 colonies of these microscopic vegetable germs. He added alum, in the proportion of half a grain to a gallon, and found that not only were the earthy and vegetable matters precipitated, that the colonies of bacteria were reduced from 8,100 to eighty, and these were of large size.

The National Association of Master Plumbers of the United States, which will shortly meet in annual convention, has compiled the following list of subjects for papers to be read on that occasion: "Does the plumber have the same confidence reposed in him as the family physician ; if not, why not?" "How to promote the unity of the Associations ;" The disposal of drainage in inland cities?" "The Holly water system and its advantage for interior towns ;" "The artesian well ;" "Competition ;" "Salt-glazed sewer pipe vs. cast iron pipe for interior drainage ;" "The comparative advantages of lead or galvanized iron pipe for waste-pipes ;" Flushing of water-closets and urinals," "The lighting of a country residence ;" "Surface water drainage ;" "Ventilating pipes ;" "The drainage of a country house," "American vs. imported earthenware ;" "Hot-water and steam heating ;" "The prevention of water-waste ;" "Out-door closets in cold climates ;" "The disposal of garbage ;" "The lead-worker ;" "History of the pump ;" "Electricity and plumbing ;" "Automatic flushing ;" "The plumber as an inventor ;" "Natatoriums ;" "Air currents in buildings," "The plumbing fraternity."

It has been well remarked that in the earlier tracery the form of the lights was most studied, while in the latter the outline of the tracery bar has been the most attended to. While the last merits its share of attention, it seems clear that, as a window is essentially an opening or a combination of openings, the forms of its lights, rather than of the lines which separate them, have the first claim upon consideration. The decorated variety seems to be the latest in which the claim was fully admitted, and it unites, perhaps, more than any other the beauty both of openings and of the lines.—*Sir G. G. Scott.*

Painters' cream is a preparation used by painters to cover up work they are obliged to leave unfinished for a length of time. They cover with it the parts already painted, and it preserves the colors, and can easily be removed when the work is again taken up. It may be made as follows : Take half an ounce of the best mastic, finely powdered, and dissolve over a gentle fire in three ounces of nut oil. Pour the mixture into a marble mortar, with two drachms of powdered sugar-of-lead at the bottom of it. Stir this with a wooden pestle, and keep adding water in small quantities till the whole appears like cream and refuses to admit more water so as to mix freely.

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction works in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

PARKHILL, ONT.—A water works project is on foot.

BOWMANVILLE, ONT.—The town will put in waterworks.

FOREST, ONT.—A new English church is to be built this summer.

INGERSOLL, ONT.—The C. P. R. will build a new brick station.

WOODSTOCK, ONT.—A new post office building is to be erected here.

QUEBEC.—A new City Hall is proposed, and a site for the same has been offered.

PORT HOPE.—The Grand Trunk viaduct will be rebuilt to accommodate a double track.

GRENFELL, ONT.—A new Methodist church and an Agricultural Hall are to be built here.

CHICOUTIMI, QUE.—There is a probability that water works will be established here shortly.

WINDSOR, ONT.—The Town Council has accepted the offer of J. C. Patterson, M. P., of a free site for a new high school.

HAMILTON, ONT.—The $30,000 necessary for the erection of the new Y. M. C. A. building has been secured, and work will be commenced at once.

The contract for the stone work of the G. T. R. shops at Stratford has been awarded to Mr. Wm. Gibson, proprietor of the Beamsville quarries.

OSHAWA, ONT.—Plans for the R. S. Williams & Son's new piano factory in this town have been prepared by architects King & Gouinlock, of Toronto.

WINNIPEG, MAN.—The Salvationists will probably erect a barracks this summer.—A company is seeklog incorporation for the purpose of erecting a large brewery here.

ST. JOHN'S N. B.—A syndicate of Americans have acquired 300 acres of land, near this city, and intend erecting large pulp works and cottages for their workmen, at a cost of $800,000.

WIARTON, ONT.—Architect J. C. Foster, Owen Sound, has prepared plans for a new Opera House to be erected here. The building will be furnished with all modern stage attachments and fittings.

The handsome dressed limestone building almost completed for the British American Bank Note Company, Ottawa, collapsed last week. The building cost $46,000 and can only be restored at loss of $10,000 or $15,000.

LONDON, ONT.—The Chemical Manufacturing Company will erect a fireproof brick and iron building in place of that recently destroyed by fire. The new structure will cost about $5,000.—A 60 feet addition to the Michigan Central freight sheds is to be erected.

OWEN SOUND, ONT.—A new ward school to cost about $5,000 is to be erected on West street. There will also be additions made to the Market street school.—The Disciples congregation will erect a larger building than the one they now occupy ; the architect is Mr. J. C. Foster.

OTTAWA, ONT.—The Railway Committee of the Canadian Senate have adopted the bill authorizing the construction of the international bridge over the Detroit river.—A by-law to expend $210,600 in public works has been ratified by the ratepayers.—The Departmen. of Railways and Canals has received plans for the new railway bridge over the St. Lawrence at Montreal to be built by a joint stock company at a cost of $200,000.

MONTREAL.—The Local Government will expend $1,000,000 on a new courthouse to be erected on the DeBameray property facing the City Hall.—The Protestant School Commissioners, of Montreal, are preparing to built two new schools, one in Hochelaga Ward and one in St. Jean Baptiste Ward.—A large and handsome cut stone building five stories high with a mansard roof will be erected on the site of the building which was recently burned on the corner of St. Paul street and Jacques Cartier street.—Mr. L. O. David, president of the St. Jean Baptiste Society and M. P. P. for Montreal East, proposes the erection by the Society of a grand French-Canadian National Hall at Montreal, which will be the meeting place for important gatherings.

TORONTO, ONT.—The Canadian Bank of Commerce will erect a new building at the corner of Spadina Avenue and College street. —A public school is to be erected on the Island.—The St. George's Society have selected a site and will erect a building on the north side of Elm street. Estimated cost, $5,000.—Tenders are wanted by the Ontario Commissioner of Public Works for the necessary iron work for the new Parliament buildings. Particulars in advertisement in this paper.—Chief Engineer Perley, of the Public Works Department, recommends the dredging of the eastern entrance to Toronto harbor to a depth of 18 feet, and the protection of the sides of the channel to prevent it from again filling up. The estimated cost of the work is as follows :—Crib work, $524,000 ; dredging foundations, $20,000 ; dredging channels, $15,000 ; stone in talus, etc., $25,000 ; contingencies, etc., $62,000 ; total, $686,000.—The plans for the new drill shed are being prepared at Ottawa, and tenders for the erection of the building will be called for shortly.—The Congregationalists of West Toronto Junction will ask for tinders for the erection of a new brick church to cost $15,000.—The City Engineer has asked the Council for the sum of $205,513 to be expended on the maintenance, repairs and reconstruction of sewers, culverts, manholes and roadways.

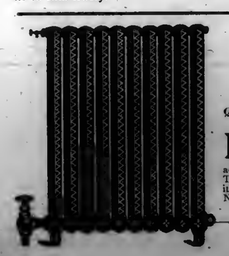
The following building permits were issued from the City Commissioner's office during last month :—Thos. McDonald, 2 storey brick add. and one storey bk. building, Sherbourne st., cost $1,000; Robt. Sargent, additions to Nos. 274, 276, 278 Sherbourne st., cost $2,400 ; Mr. O'Grady, 2 storey r. c. dwelling, Mission Ave., cost $1,500 ; R. L. Fraser, mansard roof on 3 dwellings, Church st., cost $2,500 ; F. G. Stewart, 3 storey bk. dwelling, Queen's Park, cost $12,000 ; brick Presbyterian church, cor. Dundas st. and Dovercourt Rd., cost $45,000 ; brick Methodist church, Bathurst st., cost $25,000 ; C. R. S. Dinnick, two pairs bk. houses, east side Borden st., near College st., cost $16,000; T. M. Bryer, 6 attached 2 storey bk. dwellings, cost $7,200 ; E. B. Freeland, 2 storey and attic bk. dwelling, Park Rd., cost $3,500 ; Mr. Levack, pair 2 storey bk. stores and stables, Grange Ave. and Huron sts. cost $5,500 ; E. E. Pike, 2 storey and attic bk. dwelling, Harbord st., cost $3,700 ; Murran Bros., pair s. d. 2 storey and attic bk. dwellings, Lowther Ave., cost $10,000 ; John Douglas, pair s. d. 2 storey and attic bk. dwellings, Harbord st., cost $7,500 ; S. Mercer Adams, three 3 storey bk. stores and hall, McCaul & Queen sts., cost $10,000 ; Verral Transfer Co., bk. stables, York and Piper sts., cost $6,000 ; Gooderham & Worts, galvanized iron elevator, Esplanade st., foot of Parliament st., cost $25,000 ; trustees Western Congregational Church, bk. church, Spadina Ave., cost $20,000 ; Brady & Bell, pair att. r. c. houses, Walton st., cost $1,400 ; J. Wardell, pair att. 2 storey and attic bk. dwell., Spadina Ave., cost $3,500 ; trustees Spadina Ave. Methodist Church, stone and bk. church, cor. Spadina and College sts., cost $65,000 ; Bertram & Co., bk. add. 114 Yonge st., $4,000 ; trustees Bond st. Congregational church, bk. add., cost $16,000 ; Dr. J. E. Graham, 2 storey and attic bk. dwelling, Church st., cost $7,000 ; C. C. Witchell, 3 storey bk. store, Spadina Ave., near College, cost $3,000 ; T. A. Lytle & Co., 3 storey bk. add. to factory, Richmond st. w., cost $3,000 ; David Richards, pair 2 storey and attic bk. dwellings, McCaul st., cost $11,000 ; Scott & Graham, 2 detached bk. dwellings, Dovercourt Rd., cost $10,000 ; Wm. Dineen, alterations at 224 and 226 Sherbourne st., cost $2,400 ; J. L. Thompson, two 3 storey bk. stores, Lombard st., cost $20,000 ; Victoria Rink Co., brick and glass rink, Huron st., cost $30,000 ; Public School Trustees, 2 storey and attic bk. school, Duke st., cost $20,000 ; R. Starr, two 5 storey bk. stores, Wellington st., cost $45,000 ; Mrs. Gilbert, pair s. d. 2 storey r. c. dwellings and alterations at 146 and 148 Seaton st., cost $5,500 ; A. Patterson, 7 att. 3 storey bk. stores, Gloucester and Yonge sts., cost $2,500 ; Mason & Risch, bk. add, to piano factory, King st. w., cost $10,000.

Of Japanese raised leather paper designs for fillings, dadoes, borders and friezes, there is this spring an endless variety.

The erection of a reredos in St. Paul's Cathedral, London, is said to have caused great dissension in the ranks of the Evangelical party, some of whom defend such decoration, while others pronounce it unjustifiable.

There are friezes that look well in lighter tints than the wall color, but the general practice is to have the coloring stronger than the latter. One rule which should be applied to either mode is, that the forms should be distinct however vague the general wall design. Where mouldings of rooms are very heavy, grey and lightsome friezes of more than ordinary depth should be introduced to lessen the too heavy effect.

In the constructive arrangement of relief and chased work, mere tangles of leaves, branches, flowers and scroll work are not to be admired. The way to escape such floridity and exaggeration is by a geometric development of some feature of the form of the principal figure or figures in the other parts, with a certain amount of simplicity as opposed to bewildering labyrinthine windings.



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SECTIONAL HOT WATER AND STEAM RADIATOR

PATENTED 1886 IN CANADA AND THE UNITED STATES. THE BEST HOT WATER RADIATOR IN THE MARKET.

Quick Circulation ; Easily Repaired ; Its Capacity increased at very Little Extra Cost ; does not need a Fancy Cast Iron Top or Marble Slab ; in fact, Just the Radiator that Suits the Requirements of the Market.

BY the construction of this Radiator, each section has (entirely distinct from each other) a separate and positive circulation within itself, producing not one slow, sluggish, continuous circulation, but as many sharp and constant circulations as there are sections composing the Radiator, thereby maintaining a greater heat from a given surface. It has another advantage that will be appreciated by the Trade : the inlet and outlet are both at the same end; and has been arranged that it may be used for Hot Water or Steam without making any changes to the connections, or any alterations whatever—a feature possessed by no other Radiator that we are aware of. We also claim that with this Radiator any person in the Trade can replace a section, or add sections to increase its capacity, without returning it to the manufacturer. This alone is an advantage, particularly in cases outside the city in which it is manufactured. These Radiators are now fitted up in the following buildings, viz., Hull Post Office, Peterborough Post Office, Pictou Custom House, N.S.; Pictou Marine Hospital, N. S. ; Winnipeg Custom House, Kingston Custom House, Three Rivers Custom House, Point St. Charles Post Office, and many other private dwellings.

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GARTH & CO., - 536 to 543 Craig St., MONTREAL.

SEND FOR PRICE LISTS.

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IMPORTERS OF *Every kind of ROLLED PLATES, and Plain, Colored and Ornamental WINDOW GLASS.*

BRITISH ROUGH-CAST MIRROR

Telephone No. 1599. *Cable address, "PLATE."*

PLATE GLASS

PLATE GLASS shipped to and FIXED at any point in the Dominion.

IMPORTING CO.

55 and 57 Victoria Street,

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W. STAHLSCHMIDT & CO.,

PRESTON, - ONTARIO,

MANUFACTURERS OF

Office, School, Church and Lodge Furniture.

SEND FOR *CIRCULARS* AND *PRICE LISTS.*

THE CANADIAN GRANITE CO. (LIM.)

OTTAWA, - ONTARIO,

QUARRY OWNERS and MANUFACTURERS,

Invite the attention of Architects and others to their productions in the finest grades of

RED AND GREY GRANITE.

Every description of Architectural, Building and Monumental Work executed with economy and dispatch by the latest and most approved machinery.

Special Rates on COLUMNS, VASES, TERMINALS, Etc.

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Finest Curling Stones in the Market.

Marble Work in all its branches, Mantel Pieces for the cottage or mansion, Slabs, Tiles Paving, Etc.

For Estimates, Samples, Etc., write to the Works,

CANAL BASIN, OTTAWA.

POROUS EARTHENWARE - - - OR - TERRA COTTA

FOR Fireproof building purposes is recommended by Architects and Insurance Companies as unexcelled for protecting against fire. It is not cracked or injured by the application of heat or water. Weight is only one third that of brick. Mortar adheres to it without the use of lath. It may be nailed, sawed and worked with carpenter's tools. It takes the place of wood or brick for outer and inner walls and floors at about the same cost, ensures immunity from dampness and vermin, giving warmth in winter and coolness in summer, lowers insurance, and increases the life of the building.

Persons contemplating rebuilding old structures or erecting new, are solicited to consult their architects or write us direct in reference to this material.

THE RATHBUN COMPANY,

DESERONTO, - - ONTARIO.

MILLER BROS. & MITCHELL,

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HYDRAULIC, STEAM AND HAND

ELEVATORS

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PASSENGER AND FREIGHT SERVICE,

In Hotels, Warehouses, Office Buildings, Etc., Etc.

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CELEBRATED RIVERVIEW STONE QUARRIES AND LIME KILNS.

DEALER IN ALL KINDS OF BUILDING STONE AND LIME.

Practical Stone Cutter, 25 Years' Experience.

ORDERS SOLICITED. CORRESPONDENCE IN ENGLISH, GERMAN OR FRENCH

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METALLIC SHINGLES

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We guarantee every building covered with Shingles will give absolute protection from wind, rain or snow, and give double the service of the same material put on by any other method. They are fire-proof, and make the handsomest roof known, and easily put on.

Send for particulars.

THOS. McDONALD & CO.,

Sole Manufacturers in Canada,

69 TO 75 SHERBOURNE STREET, - - TORONTO, ONT.

McCAUSLAND & SON Choicest Foreign & English & American Stained Glass 24 & 76 KING W.

FOOT-POWER MACHINERY.

COMPLETE OUTFITS for CONTRACTORS and BUILDERS.

Machines for ripping, cross-cutting, scroll-sawing, mortising and tenoning, forming edges, grooving, gaining, rabbeting, cutting dadoes, and turning. Builders use our Hand Circular Rip Saw for the greater portion of their ripping in preference to carting their lumber to a mill five minute's drive from their shops. The same is true in regard to scrollsawing, mortising, tenoning, cutting stuff for drawers boxes, etc. Builders using these machines can bid lower and save more money from their contracts than by any other means.

Read the Following Letters from Builders:

CLARENCE F. LEE, carpenter and builder, Morristown, N. J., says: "I have had one of your Hand Circular Rip-Saws for about three months, and am much pleased with it. Have done the ripping for 35 houses in that time, which is over forty miles through inch boards. Have ripped as high as 3-inch plank. Table is also good for rabbeting; having rabbeted all jambs and sawed all drips for 200 windows."

ALEX. SHIELDS, Lima Ohio, says: "A few days since we had some 150 small drawers to make for a drug store ; the steam power mill wanted 50 cents each for making them. With my foot power machinery I made them, and saved $35 above good wages on the job If desired, these machines will be sold ON TRIAL.

The purchaser can have ample time to test them in his own shop and on the work he wishes them to do. Descriptive Catalogue and Price List Free.

W. F. & JOHN BARNES CO., No. Ruby St. Rockford, Ill

A. R. WILLIAMS - Soho Machine Works - TORONTO

Exclusive Canadian Agency.

Send for Catalogue. *Mention this Paper.*

Decoration

HOW TO DECORATE.

By W. H. Elliott.

IT is a mistake to suppose that because a wall paper or a piece of stained glass, or an article of furniture, or a hanging is cheap, it should also of necessity be in bad taste. Doubtless the fact that much that is cheap is bad as well, has given ground for the supposition that a good thing cannot be had without paying well for it. Therefore in the first place do not be satisfied with anything that has the negative quality of stylelessness, and that cannot be objected to because there is nothing to object to in it. Aim at an effect of some kind in every room down to the kitchen. Study the purposes for which the room is used, in the carpets, wall papers and hangings, as well as in the furniture. There is a style of design which is as appropriate for the bedroom as the bedstead is. A quiet paper in light color for the main wall, with a deep frieze or upper paper in flower designs naturally treated, generally make a good effect for a bedroom wall, with hangings of somewhat similar design to the upper paper. There being usually few unimportant pictures on bedroom walls, bright sparkling color in parts af the decoration is very desirable, to give interest to the treatment of the room. Do not be afraid of color, unless it is in bad taste. Neutral tints and absence of color are an evidence of weak taste or of a timidity begotten of ignorance. A dining room should be warm and rich in color, especially in the ceiling, the walls being a suitable background for the best pictures in the house. And so on through every room in the house, let there be evidence of study and discrimination in the selection and arrangement of every detail. Above all, do not endeavor to transplant a friend's room which you very much admire into a very different location in your own house which may make the decoration in every way unsuitable. A room into which no ray of sunlight can possibly find its way, may well be in china yellow or terra cotta and all the sunny colors of silk and cretonne, but such effects in a southerly chamber with large openings for the glowing sunlight, would almost dispense with the necessity of further warmth in the coldest weather, to say nothing of the smothering sensation one would feel during July or August on entering the room.

Again, do not buy a carpet or a drapery you particularly fancy, and then endeavor to have all the other features of the room conform to it. This is a favorite method of going to work on the decoration of a room, and it is a safe thing to calculate on very much vexation of spirit and very moderate success as results of the method.

If you have confidence in your decorator, submit your judgment to his in all matters of experience, and in most matters of taste, reserving for yourself the perhaps as important items of expense and personal preference or antipathy.

To make gold lacquer, put into a four-gallon tin one pound of ground turmeric, one and a half ounces of gamboge, three and a half pounds of powdered gum sandarach, three-quarters of a pound of shellac, and two gallons of spirits of wine. When shaken, dissolved and strained, add one pint of turpentine varnish well mixed.

Bright colors and positive tints may be employed in outside decoration with excellent effect in emphasizing architectural features, but the more brilliant they are, the greater is the demand for good judgment in their application.

With the rich and varied decoration in vogue house-painters are beginning to regard their craft as closely trenching on the fine arts. In relief work, however, they still wisely depend on the effects of light on flat and curved forms for the shade.

A new form of table lamp is in brass of ovaline form, having on two sides a concave porcelain medallion on which is painted a female form. A jet black shade pierced for medallions consists of portraits painted on porcelain, surrounded with inlaid leaves and twigs in silvery metal on the dark shade.

Were concave ceilings introduced into parlor, dining and reception rooms, better opportunities for the decoration would be afforded. A concave sky, although the curve is all but impreceptible, is certainly more pleasing than a flat sky. With such a ceiling the cove could be dispensed with, and with angular molded lines, forming border of ceiling, would disappear, giving place to flower, leaf and branch designs reaching upward and outward. To a lofty room such a ceiling would impart increased stateliness. Where the ceiling is structually flat, converging ribbed arches with central pendent, or base might be carried out in papier mache. Rooms present so many angles, mantels and furniture contributing a considerable share, in addition to walls that curvilinear forms are welcome variations. Even deep coffers, polychsomatically decorated, are enhanced in beauty by a curved ground, which carries the eye naturally from one side to the other of the ceiling surface, thus causing it to take in the whole.

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$34 00@	35 00
1¼ and thicker, three uppers, Am. ins		40 00
1¼ and thicker, pickings, Am. ins.		30 00
1 x 10 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
1 x 10 and 12 dressing	14 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
1 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1¼ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	16 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		15 00
1½ inch flooring	14 00	15 00
XXX shingles, sawn	$2 40 @	2 50
XX shingles, sawn	1 30	1 50
Eastlake painted iron shingles, per square, (10,000 feet)		4 50
Eastlake painted tin shingles, per square		4 50
Eastlake genuine galvanized iron shingles, per square		7 00
Metalion brick siding, per square		3 50
Special siding, per square		3 50
Lath, sawn		1 80

YARD QUOTATIONS.

Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		12 00
Shipping cull boards, stocks		13 00
Scantling and joist, up to 16 ft		14 00
" " 18 ft		15 00
" " 20 ft		16 00
" " 22 ft		17 00
" " 24 ft		19 00
" " 26 ft		20 00
" " 28 ft		22 00
" " 30 ft		24 00
" " 32 ft		26 00
" " 34 ft		28 50
" " 36 ft		30 00
" " 38 ft		32 00
" " 40 to 44 ft		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board	18 00	20 00
Dressing stocks	16 00	18 00
Picks, American inspection		40 00
Three uppers, American inspection		50 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 4 x 14, per M		12 00

B. M.

1½ inch flooring, dressed	25 00	30 00
1½ " rough	14 00	15 00
1¼ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		2 25
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

BRICK.—℔ M.

Common Walling		$ 8 50
Good Facing		10 00
Sewer		9 50

Stone:

Common Rubble, Per Toise, delivered		14 00
Large flat " "		18 00
Foundation Blocks, " Cubic Foot		40

Slate: Roofing (℔ square).

" green	5 00	6 00
" " unfading	5 00	6 00
" purple	5 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me	5 50	8 00
" black slate		7 50
Tiles, American, ℔ M		
N. Peach Bottom, warranted unfading		

Sand:

Per Load of 1½ Cubic Yards		1 25

PAINTS. (In oil, ℔ lb.)

White lead, Can	6	6 50
" zinc, Can	6½	8 50
Red lead, Eng	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" Indian, Eng	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (℔ Imp. gal.)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3¼
Whiting, dry	75	1 00
Paris white, Eng., dry	1 25	1 50
Litharge, Am., "	6½	8
Sienna, burnt	15	20
Umber, "	8	12

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey		40
" " " White		60
Plaster, Calcined, New Brunswick		2 20
" " Nova Scotia		2 10
Hair, Plasterers', per bag		1 00
Cement, Portland, per bbl		3 00
" Thorold, "		1 50
" Queenston, "		1 50

HARDWARE.

Cut Nails:

American Pattern, 1¼ inch, per keg		4 50
" " 1½ to 1¾ inch, per keg		3 75
Canadian Pattern, 1¼ inch, per keg		$ 4 00
" " 1½ to 1¾ inch, per keg		3 50
" " 2 to 2¼ inch, "		3 50
" " 2½ to 2¾ inch, "		3 25
" " 3 inch and larger		3 00
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg		6 05
" " 1¼ inch, "		5 30
" " 1½ " "		5 05
" " 1¾ " "		3 60
" " 2 inch and larger		4 00

Iron, etc.

Refined, ℔ 100 lb. or ordinary size	2 25	2 35
Common, ℔ 100 lbs	2 00	2 10
Patent metals, ℔ lb	0 00	0 11
Anchors, ℔ lb	0 05½	0 06
Chain cables, ℔ lb	0 03	0 06
Rigging chains, per lb	0 03	0 3½

ST. JOHN, N. B.

Iron, etc.

Refined, ℔ 100 lb or ordinary size	2 25	0 00
Common, 100lb	2 10	0 00
Patent metals, ℔ lb	0 00	0 11
Anchors, ℔ lb	0 00	0 00
Chain cables, ℔ lb	0 03	0 06
Rigging chains, ℔ lb	0 03	0 3½

Nails.

Cut, 3dy, ℔100lb	3 75	0 40
Cut, other sizes	2 74	3 50
Ship Spikes	3 70	5 00
Galvanized	5 25	6 50

MONTREAL PRICES.

Lumber, Etc.

Ash, 1 to 4 in., M	$13 00@	25 00
Birch, 1 to 4 inch, M	15 00	25 00
Basswood	13 00	20 00
Walnut, per M	60 00	95 00
Butternut, per M	30 00	40 00
Cedar, flat	00 04	00 06
Cherry, per M	60 00	80 00
Elm, Soft, 1st	15 00	17 00
Elm, Rock	25 00	30 00
Maple, hard, M	20 00	25 00
Maple, Soft	16 00	18 00
Oak, M	40 00	60 00
Pine, select, M	35 00	40 00
Pine, 2nd quality, M	32 00	30 00
Shipping Culls	14 00	16 00
Mill Culls	8 00	10 00
Lath, M	1 75	2 00
Spruce, 1 to 2 inch, M	10 00	13 00
" Culls	4 50	6 00
Shingles, 1st quality	2 00	3 00
" 2nd "	1 25	2 00

Cement, etc.

Portland Cement, per barrel	$ 2 75@	3 25
Roman " "	2 75	3 00
Fire Bricks, per M	22 50	27 50

Cut Nails:

Hot-cut Am. or Can. pattern, 3 inch and above		$2 90
Hot-cut Am. or Can. pattern, 2¾ inch and above		3 15
Hot-Cut Am. or Can. pattern, 2¼ and 2 inch		3 40
Am. pattern, 1½ and 1¾ inch hot-cut		3 60
" 1¼ inch " "		4 40
Can. Pattern, cold-cut, 1½ and 1¾ inch		3 40
" " 1¼ inch		3 95
Finishing Nails, per 100 lb. keg, 1¼ and 1½ inch	$ 5 55	4 80
Finishing Nails, per 100 lb. keg 1½ to 1¾ inch	4 55	4 30
Finishing Nails, per 100 lb. keg, 2 inch and up		3 08

Paints, etc.

White Lead, pure, 25 to 100 lb. kegs.	5 50	6 50
" No. 1	5 50	5 75
" No. 2	4 75	5 25
" No. 3	4 50	4 75
" dry	5 50	6 00
Venetian Red, English	1 50	1 75
Yellow Ochre, French	1 25	3 00
Whiting, London, washed	0 50	0 60
" Paris, "	1 15	1 25

Oils:

Linseed, raw	0 59	0 60
" boiled	0 62	0 63
Olive, pure	1 00	1 15
" machinery	0 95	1 00
" extra, qt., per case	3 00	3 50
" " pts., "	2 40	2 60
" " ½ pts., "	2 70	2 90
Spirits turpentine	0 50	0 63

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ROSENBERG'S CELEBRATED ELASTICA.

Send for price lists. Tel. 701.

Notice to Contractors.

SEALED TENDERS, addressed to the undersigned, and endorsed, "Tender for Iron Work of Parliament Buildings," will be received at this Department until noon of Thursday, the 17th day of May, for sundry wrought and cast iron work required for the new Parliament Buildings.

Printed specifications and forms of tender can be obtained at this Department. All blanks in form of tender are to be properly filled up; and tenders must, as to form, sureties and otherwise, comply with the terms set forth in the specifications.

An accepted bank cheque for the amount of Fifteen hundred dollars, and payable to the order of the undersigned, must, subject to and upon the conditions mentioned in the specifications, accompany each tender.

Security for the fulfilment of any contract entered into is to be given as stipulated in the specifications; but the Department will not be bound to accept the lowest or any tender.

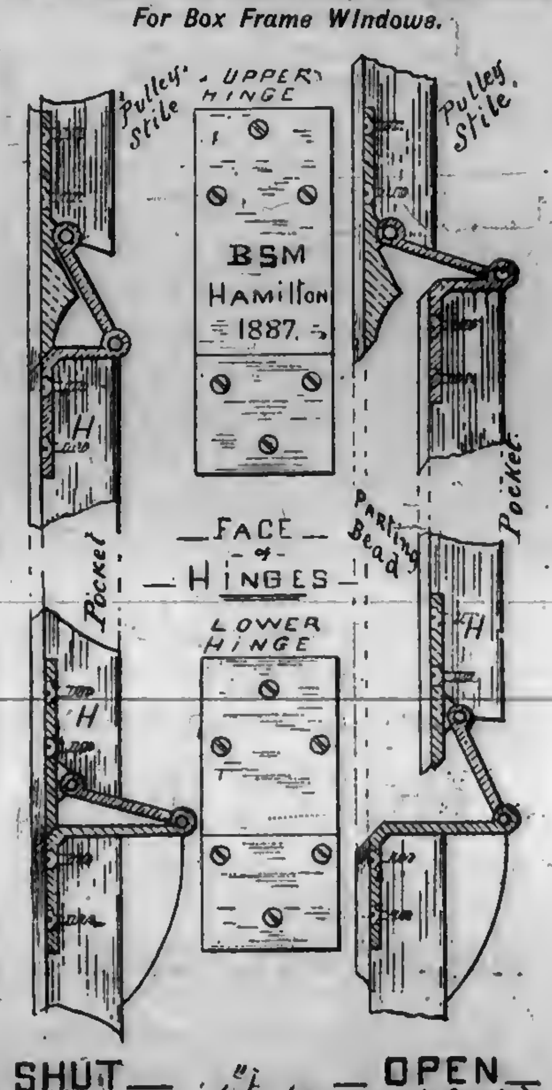
C. F. FRASER,
Commissioner, &c.

Department of Public Works for Ontario,
Toronto, 30th April, 1888.

YOUNG'S

IMPROVED PULLEY STILE HINGES

For Box Frame Windows.



WITH the above hinges the ordinary double hung window sashes can be taken out of the frames for cleaning, &c., without disturbing the stops or parting heads, and are the result of long experiment, to insure strength and perfect action. The parting heads are cut to mitre, and slide in with the pockets H, to clean the check of sash—thus the sash recedes in at one side, and cleaning the opposite parting head is taken out, the pulley boxes are in the pockets H, and the lines are held in a lock plate on inside of sash by means of a knot on the end of the line, which is released and run up to the pulley box in taking out the sash. The attention of architects and builders is called to these hinges. For further information and price apply to the inventor,

J. H. YOUNG,

117 KING ST. WEST, - HAMILTON, ONT.

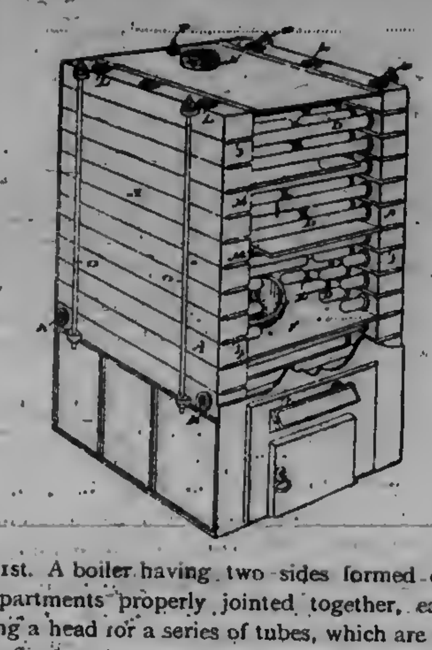
AGENTS WANTED.

MANUFACTURING MATERIALS.

RECENT PATENTS.

Sectional Boiler for Heating Purposes.

No. 28,775. George Guest, Toronto, Ont., dated 27th March, 1888.



Claim.—1st. A boiler having two sides formed of a series of hollow compartments properly jointed together, each compartment forming a head for a series of tubes, which are screwed into, or otherwise fixed to the compartments and arranged in relation to the fire-pot in such a manner that, while connecting the compartments forming the sides of the furnace, the expansion and contraction of the tubes will not twist or injuriously affect the compartments forming the said sides, substantially as and for the purpose specified. 2nd. The compartments A arranged one above the other and connected by water-legs G, the joints between the compartments being formed on their outer edges so as to have a space *j* between each compartment, substantially as and for the purpose specified. 3rd. The compartments A arranged one above the other and connected by water-legs G, in combination with the tubes D, each connected at one end with one of the compartments, and plugged or otherwise closed at its other end, a horizontal partition J, with an opening K through it, being placed in each tube, substantially as and for the purpose specified. 5th. The compartments A arranged one above the other and connected by water-legs G, in combination with the tubes D, each connected at one end with one of the compartments and plugged or otherwise closed at its other end, tubes I arranged to connect the compartments A with a water-leg H, substantially as and for the purpose specified. 6th. The compartments A arranged one above the other and connected by water-legs G, in combination with the tubes D, each connected at one end with one of the compartments, and plugged or otherwise closed at its other end, and deflecting plates M, substantially as and for the purpose specified.

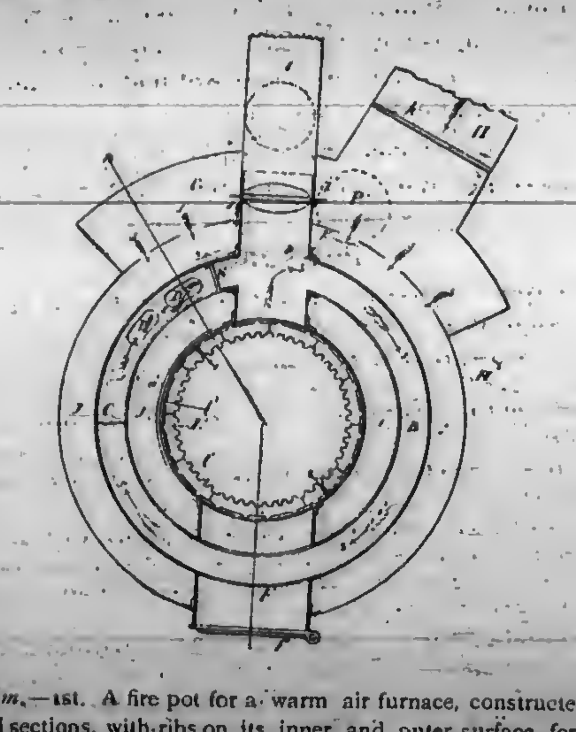
Composition for Plastering and Decorating the Interior and Exterior of Walls with a Material known as "Carton-Pierre."

No. 28,719. Alfred J. Pigeon, Montreal, Que., dated 16th March, 1888.

Claim.—A compound composed of glue, mollasses, bichromate of potassium or chrome alum, or tannic acid, glycerine, wood, straw or other fibrous pulp, clay, whitening and raw linseed oil, substantially in the proportions specified and for the purpose herein set forth.

Warm Air Furnace.

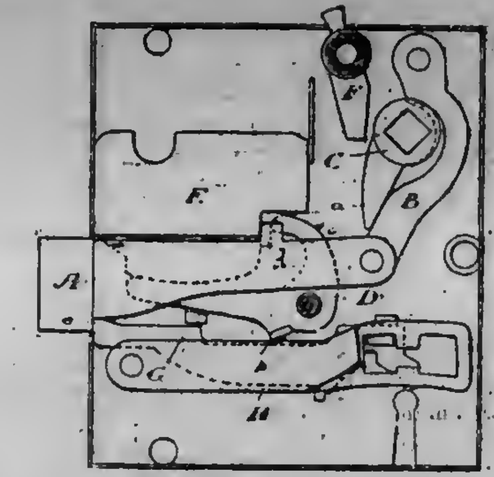
No. 28,743. Thomas G. Wanless, Toronto, Ont., dated 22nd March, 1888.



Claim.—1st. A fire pot for a warm air furnace, constructed of vertical sections, with ribs on its inner and outer surface, for the purposes set forth. 2nd. A combustion dome for a warm-air furnace, constructed so as to encircle the fire pot to keep the sections thereof in position, and also provide an air space between the combustion dome and fire pot, said combustion dome provided with a number of small apparatuses around its circumference and near to the lower edge thereof, for admitting air which passes up through the air space between the fire pot and combustion dome, to ignite the gases arising from the burning fuel, as set forth. 3rd. The annular rim encircling the combustion dome at its lower edge, and provided with apertures equal in size and number to those in the dome, and so placed as to coincide with the apertures in the dome, and which rim may be moved sidewise by rod of lever for the contraction or enlargement of said apertures, as set forth. 4th. A dual radiator for a warm air furnace, constructed so that the active heat will pass from the combustion dome into, and circulate around the upper portion thereof, thence passing down suitable pipes into, and circulate around the lower section thereof thence passing out into the smoke-pipe, from which it is carried to the the chimney, as specified and described. 5th. A cold air receiver for a warm air furnace, constructed partly around the outer side of the base of the furnace casing, for receiving and distributing the cold air to the warm air chamber inside of the furnace casing, as set forth. 6th. An air pipe for a warm air furnace, connecting the cold air receiver with one or more of the warm air pipes, for the purpose of supplying cooler air to the apartments of the building, when necessary, as specified and shown. 7th. In a warm air furnace, the combination of two radiators B and C, placed horizontally one above the other and by means of stop plates N, direct draught regulator b_2, junction pipes D, the active heat is made to circulate entirely around each radiator before passing out into the smoke pipe, substantially as arranged and operating as set forth. 8th. In a warm air furnace, the combination of the combustion dome A, fire pot L, grate K_2, ash pan K, dust pipe E, with check damper e_1, substantially as arranged and operating as set forth. 9th. In a warm air furnace, the combination of the cold air box H, with regulating slide *h*1, cold air receiver G, cold air pipe P, warm air chamber J and warm air pipes H_1, substantially as arranged and operating as set forth.

Gravity Lock.

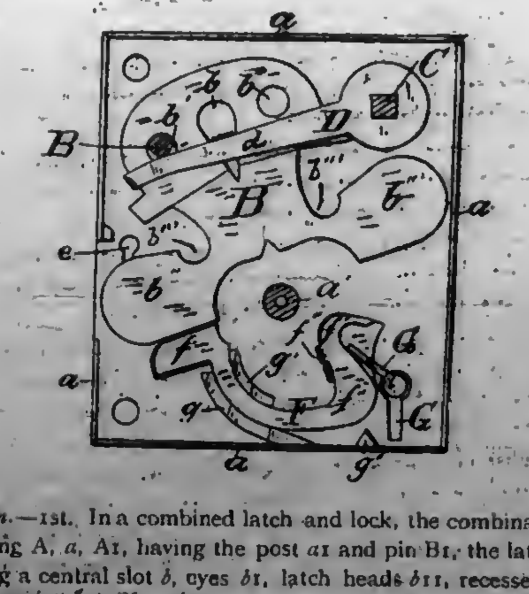
No. 28,573. The Peterborough Lock Manufacturing Company, (assignee of Charles S. Osgoode), Peterborough, Ont., dated 22nd March, 1888.



Claim.—1st. The combination, with a latch-bolt, of a pivoted lever having its short arm in contact with the latch-bolt, with its long arm arranged to support a vertically-adjusted weight, substantially as and for the purpose specified. 2nd. The combination, with a latch-bolt, of a pivoted lever having its short arm in contact with the latch-bolt, its long arm arranged to support a vertically-adjusted weight and its heel in contact with the tumbler of the lock, substantially as and for the purpose specified. 3rd. The combination, with a latch-bolt, of a pivoted lever having its short arm in contact with the latch-bolt, and its long arm arranged to support a vertically-adjustable weight; and a pivoted stop arranged to lock the weight, substantially as and for the purpose specified. 4th. A pivoted lever arranged to support a vertically-adjustable weight and formed so as to be in contact with the stop-side of the tumbler of the lock, in combination with the lock-bolt formed so that its end may be adjusted against a shoulder formed on the head of the latch-bolt, substantially as and for the purpose specified. 5th. A latch-bolt A pivotally connected to the pivoted hanger B, which is actuated by the tongue *a*, formed on the spindle-bearing C, a projecting lip *d* formed on the bolt A, and extending close to the short arm *b* of the lever D, in combination with the vertically-adjustable weight E, arranged to rest upon and supported by the long arm of the lever D, substantially as specified. 6th. A pivoted lever D arranged to support the vertically-adjustable weight E, and having a lip *h* extending over the tumbler H, in combination with the said tumbler and with the lock-bolt G, arranged so that its end may be thrown against the shoulder *e*, formed on the head of the latch-bolt A, substantially as and for the purpose specified. 7th. A keeper I having a bevelled projection *f*, in combination with a square-ended latch-bolt, substantially as and for the purpose specified.

Combined Latch and Lock.

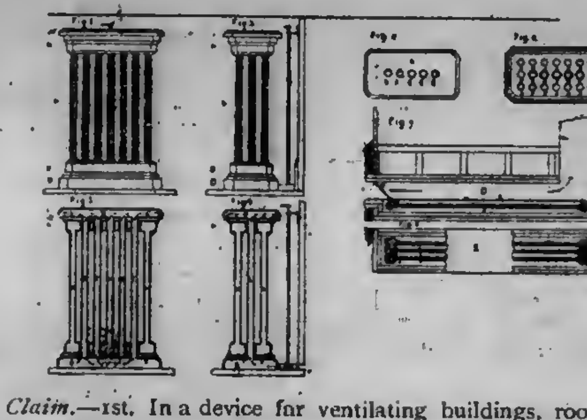
No. 28,766. Charles Sandford, William Feeney and James Feeney, Madoc, Ont., dated 24th March, 1888.



Claim.—1st. In a combined latch and lock, the combination of the casing A, *a*, A_1, having the post a_1 and pin B_1, the latch bolt B having a central slot *b*, eyes b_1, latch heads b_{11}, recesses b_{111}, and lugs b_{1111}, hung eccentrically upon the pin B_1 and resting in its normal position upon the post a_1, the lever D adapted to be operated by the spindle C, and operating the latch bolt B by lugs *d* d_1, engaging the slot *b* and lug b_{111}, a latch key E engaging the lug b_{1111}, and inserted through keyholes *e*, partly covered by the latch bolt B, locking cams F, F, guided in a race *g*, g_1, g_{11}, g_{111}, and having heads *f*, f_1 and shoulder f_{11}, and adapted to be operated by a key, the head *f* adapted to shut between the post a_1, and the rear shoulder of the projecting latch bolt, substantially as set forth. 2nd. In a combined latch and lock, the combination of the casing A, *a*, A_1, having the post a_1 and pin B_1, the latch bolt B, having a central slop *b*, eyes b_1, latch heads b_{11}, recesses b_{111} and lugs b_{1111}, hung eccentrically upon the pin B_1, and resting in its normal position upon the post a_1, the lever D adapted to be operated by the spindle C, and operating the latch bolt B by lugs *d*, d_1, engaging the slot *b* and lugs b_{1111}, a latch key E engaging the lug b_{1111} and inserted through the keyholes *e*, partly covered by the latch-bolt B, substantially as set forth. 3rd. In a combined latch and lock, the combination of the casing A, *a* A_1, having the post a_1 and pin B_1, the latch bolt B having a central slot *b*, eyes b_1, latch head b_{17}, recesses b_{111} and lugs b_{1111}, hung eccentrically upon the pin B_1, and resting in its normal position upon the post a_1, an operating lever acting upon the latch bolt B by a lug *d*, substantially as set forth. 4th. In a combined latch and lock, the combination of the casing A, *a*, A_1, having the post a_1, pin B_1, guides *g*, g_1, g_{11}, g_{111}, keyhole G_1, the latch bolt B, having a central slot *b*, eyes b_1, latch heads b_{11}, recesses b_{111} and lugs b_{1111}, hung eccentrically upon pin B_1 and resting in its normal position upon the post a_1, an operating lever acting upon the latch bolt B by a lug *d*, and the cams F, F_1, having heads *f* fitting in the recess between the post a_1 and the rear shoulder of the forward end of the latch head b_{11}, shoulder heads f_1 adapted to be operated by a key, and shoulders f_{11} adapted to be engaged by the stop g_{11}, substantially as set forth.

Ventilator in Connection with Hot Water Heating Apparatus.

No. 28,640. Charles C. Longard, N. S., dated 6th March, 1888.



Claim.—1st. In a device for ventilating buildings, rooms and apartments, in connection with hot water radiators, the construction and arrangement of the diaphragm K with or without a non-conducting lining, the air pipes or conduits E, and the diaphragm K_1 between the current of fresh air and the base, pipes, top and other parts respectively of the radiator, substantially as and for the purpose described. 2nd. In a device for ventilating buildings, rooms and apartments, in connection with hot water radiators, the combination of the diaphragms K (with or without a non-conducting lining) and K_1, and the air pipes E, substantially as and for the purpose described. 3rd. In a device for ventilating buildings, rooms and apartments, in connection with hot water radiators, the combination of the diaphragms K (with or without a non-conducting lining) and K_1, the air pipes E and the chambers of air spaces C and H, substantially as and for the purposes described. 4th. In a device for ventilating buildings, rooms and apartments, in connection with hot water radiators, the combination of the diaphragms K (with or without a non-conducting lining) and K_1, the air pipes E and the air chamber C, substantially as and for the purpose described. 5. In a device for ventilating buildings in connection with hot water heating apparatus, the construction and arrangement of the diaphragm K, between the current of fresh air and the different parts of such heating apparatus, substantially as and for the purposes described. 6th. In a device for ventilating buildings, in connection with hot water heating apparatus, the intervention of a shield or diaphragm between the current of fresh cold air and the heating apparatus, to protect the water in the apparatus from freezing in consequence of a draught or current of cold air striking thereon, substantially as described.

HOW PAINTS ARE OBTAINED.

EVERY quarter of the globe, says the *Argonaut*, is ransacked for the materials—animal, vegetable and mineral—employed in the manufacture of the colors one finds in a paint box. From the cochineal insect is obtained the gorgeous carmines, as well as the crimson, scarlet and purple lakes. Sepia is the inky fluid discharged by the cuttle fish, to render the water opaque for its own concealment when attacked. Indian yellow is from the urine of the camel. Ivory black and bone black are made out of ivory chips. The exquisite Prussian blue is got by fusing horses' hoofs and other refuse animal matter with impure potassium carbonate. It was discovered by an accident. In the vegetable kingdom are included the lakes, derived from roots, barks and gums. Blue black is from the charcoal of vine stalk. Lampblack is soot from certain resinous substances. From the madder plant, which grows in Hindostan, is manufactured Turkey red. Gamboge comes from the yellow sap of a tree, which the natives of Siam catch in cocoanut shells. Raw sienna is the natural earth from the neighborhood of Sienna, Italy. When burned it is burned sienna. Raw umber is an earth from Umbria, and is also burned.

To these vegetable pigments may probably be added Indian ink, which is said to be made from burnt champhor. The Chinese, who alone can produce it, will not reveal the secret of its composition. Mastic—the base of the varnish so called—is from the gum of the mastic tree, indigenous to the Grecian archipelago. Bister is the soot of wood ashes. Of real ultramarine, but little is found in the market. It is obtained from the precious lapis lazuli, and commands a fabulous price. Chinese white is zinc. Scarlet is iodine of mercury, and cinnabar, or native vermillon, is from quicksilver ore.

DESTRUCTION OF LEAD PIPE IN MASONRY.

ACCORDING to G. V. Knarre, in a German contemporary, the destruction of lead pipe which is set in masonry is due to the action of free lime. Pesnon had previously observed that saturated lime water attacks lead, and that it was imprudent to have lead pipes in contact with cement.

If bright lead shavings and lime water are brought together with the exclusion of air, the lead will not be attacked, and its lustre will remain unimpaired for a long time. If, however, air has access the lead will be attacked violently by the lime water. After the lapse of a short time, the presence of considerable quantities of lead may be detected in solution by means of hydrogen sulphide, and the lead will be coated with yellow oxide. If lead is placed into slacked lime, milk of lime or lime mortar, and exposed to the air, the action of the lime, a thin yellow coating of oxide will be observed on the following day. The action will always be found strongest at the surface, where the absorption of oxygen from the air takes place most readily. The hydrated oxide of lead which is formed by the action of the oxygen and moisture dissolves in the lime water and is partly precipitated upon the lead as anhydrous yellow oxide. Such a coating of yellow oxide will therefore also be formed when lead pipe is brought into contact with cement or mortar containing uncombined lime in the presence of air and moisture.

A lead pipe which had been imbedded in cement was coated with a heavy reddish-yellow coating of oxide. The analysis of the coating, dried at 110° C., gave 99-05 per cent. oxide of lead, the remainder consisting of carbon dioxide with traces of silica, ferric oxide and lime. The coating therefore consisted essentially of pure oxide of lead. An analysis of the oxide coating of a second pipe are 98 69 per cent. oxide of lead, the remainder consisting of dioxide and water.

The mortar surrounding the lead pipe had the following composition:

	Per cent.
Sand	78.4
Calcium carbonate	7.45
Calcium oxide	4.15
Water	9.99

On a number of lead pipes of the Berlin water supply the oxide coating was white. When caustic lime is not present the oxide of lead formed through the oxidation will take up carbon dioxide from the air and form the white carbonate. If, on the contrary, caustic lime is not present the carbon dioxide will be absorbed by it, and the oxide of lead will keep its yellow or red color.

The greater part of the pipes with the white coating were not uniformly attacked, but only in spots, giving them a pock-marked appearance. Very often the spots were only a mm. in diameter, but the corrssion nevertheless goes quite deep into the metal. The oxide crusts are generally found to be very porous, especially that on pipe III., and absorbed liquid with much avidity, which decidedly increases the rapidity of the corrosion. The quantitative analysis of the coating on three samples of lead gives the following results:

	I	II	III
Sand	0.2	0.5	1.5
Plumbic oxide	74-3	82.7	78.4
Carbon dioxide	8.8	8.8	11.4
Sulphur trioxide	—	1.5	1.3
Nitrogen pentoxide	5.1	2.0	0.3
Lead chloride	10.6	2.6	5 8
Water	1.0	1.7	1.3

The coating of another strongly corroded pipe contained still more nitrate. Lead chloride and lead nitrate appear to play a very important part in the corrosion of lead, the chemical process corresponding to the formation of white lead, with the aid of small quantities of acetic acid. In an impure soil, the destruction of lead pipe is probably often prevented by the lack of oxygen, because the decomposition of organic matters consume all the oxygen which is present.

PAINTING ON CEMENT.

ACCORDING to the *Bulletin de la Ceramique* it is known that the caustic lime which is not in a state of combination in cement, saponifies the oil used in painting. Consequently, painting on cement is only practicable when, under the influence of the air, carbonic acid has united with the caustic lime to form carbonate of lime. When it is desired to paint cement without delay, attempts are sometimes made to neutralize the lime by acids; but the above named journal recommends in preference the use of ammonia, the acid of which combines with the lime while the acid is liberated. The effect produced is, however, only artificial. Various other expedients are referred to, but the solution of the problem would seem to consist in the use of caseine. Fresh white cheese and slaked fat lime are added to the color. The mixture hardens rapidly, assumes the consistency of stone and is insoluble in water, a formation of albuminate of lime taking place. It is accordiog to this system that the mural paintings at the Berlin War Museum were executed.

To make the composition, three parts of cheese and one of slaked fat lime are stirred, the quantity of color to be added being regulated by practice. Only earth colors, or oxides of iron would be used for light red to dark brown shades; for blue, ultramarine or cobalt blue would be used; for white, oxide of zinc, or sulphate of baryta; and for black, animal black. Inorganic colors, such as those of aniline, would not be used, nor would Prussian blue, vermillion, blue ochre and white lead be employed, on account of the sulphur present in the cheese in combination with these substances.

If the painting surface is too dry it can easily be dampened. The gaseous lime should be prepared daily, and the brushes should be cleaned after the application of each coat of paint. The process thus described is recommended for its economy, the walls of a house being painted as fast as the scaffolding is removed. The gaseous paint does not easily take fire, and is therefore considered particularly suitable for the decoration of theatres and for application to stage carpenters' work generally.

CRUSHING STRENGTH OF SOME BUILDING MATERIALS.

AT a recent meeting of the Engineers' Club of Philadelphia, Mr. Howard Murphy, secretary, presented the results of some tests of the crushing strengths of some building stones, bricks and other building material made at the Watertown Arsenal.

No. of Tests	MATERIAL.	Crushing strength in lbs. per sq. in. FROM	TO
6	Lee, Mass., Marble	20,504	22,900
10	Potomac Red Sandstone	16,625	22,102
2	Conshohocken, Pa., Limestone	14,090	13,640
2	Hummelstown, Pa., Sandstone	12,810	13,610
6	Montgomery Co., Pa., Blue Marble	9,590	13,700
3	Philadelphia Pressed Bricks	7,210	9,050
4	Indiana Limestone	7,190	10,050
11	Philadelphia Hard Bricks	5,640	20,830
10	Ohio Sandstone	3,040	16,280
6	Philadelphia Brick Masonry in Cement Mortar	1,600	2,685
6	Philadelphia Brick Masonry in Lime Mortar	799	1,914

FRENCH VENEERING PROCESS.

FRENCH wood-workers are greatly interested in a so-called new process for veneering with veneers of all kinds of wood. They claim that these veneers fully preserve the appearance and qualities of the massive wood. The veneers are pasted on strongly resisting sheets of paper and in that state sold to the trade. These veneers, the suppleness of which is, most extraordinary, can be handled quite as easily as tapestry paper and are useful for various purposes. They have all the qualities of the wood in full size and can be quite as easily washed or varnished. The mode of application on surfaces is very simple, but a certain amount of care is required, especially when great duration of work is desired. All the grooves and fissures must first of all be filled up with putty of a good quality, or plaster if it should be a wall. If the wall is new it must be washed with a warm solution of glue, 1¾ pints of glue-paste to 14 pints of water. When the glue is dry the wall may be polished with emery paper. If the object has already been papered the old paper must be removed before the veneer is applied. In cases where the object is painted it would be necessary to rub the paint with rough emery paper first and polish it with the finest kind afterwards. No coating with glue is required on the paint. A small quantity of flour-paste must then be applied to the surface prepared in this manner by means of a piece of muslin. The stuff should be applied dry and smoothed with an equally dry brush. When these operations are completed the veneer is moistened with the water to which glycerine in the proportion of one to sixteen parts is added, in order to soften the wood and give it a great suppleness when once dried. As soon as the wood has swollen uniformly enough it may be cut into different sizes as required. The surface about to be veneered is then coated with glue and the veneers are placed in proper order. They are then tightly pressed in order to expel the air. A piece of pine or cork wood may be used for that purpose. All the joint parts must be juxtaposed and not allowed to overlap, and all the paste must be carefully wiped off. As soon as the wood is dry all the stains that may have been made in these manipulations should be removed by washing with a weak solution of oxalic acid in water, one teaspoonful of acid in one and three-fourths pints of water. All these operations being completed, the wood after being well dried is rubbed by No. 1 emery paper, or No. 2 for fine woods, and afterwards thoroughly polished. For maple wood two slight coats of white shellac will be quite sufficient. Wood like oak and ash require to be filled out with wax, softened in methylated spirits and afterward polished with orange shellac or hard oil polish.

Limestone is being taken from near Madoc for building purposes in Toronto.

Mr. Charles Taylor, Drumbo, Ont., is erecting a new brick planing mill.

The firm of Halley Bros., planing mill opeaators, St. John, N. B., has been dissolved.

The Blacker Brick Co., Brantford, Ont., is the name of a new organization which commences operations with a capital of $20,000.

The Campbell Sewer Pipe Company, of Hamilton, Ont., has secured the contract of supplying Winnipeg with pipe for the current year.

Fire destroyed Mr. George Augustine's planing mill and $1,000 worth of lumber at Port Colborne, on April 30th. Total loss, $5,000. No insurance.

Wood pulp is rapidly being substituted for plaster of paris in the manufacture of all kind of building ornaments in France, where a new method has been devised.

About $1,500,000 worth of property was destroyed in the United States and Canada during the month of March through fires originating in wood-working establishments.

The firm of M. J. Hynes & Bro., terra cotta manufacturers, of Toronto, has been succeeded by the Hynes Terra Cotta and Brick Co., incorporated, with a capital stock of $200,000.

Belgian capitalists are said to have requested a Montreal civil engineer to prepare a report on the cost of material and labor, with a view to establish a large mirror and plate glass factory in Montreal or vicinity.

An English electrician, Dr. Lodge, has made experiments which he says go to show that good conductivity in a lightning rod may be a drawback to its efficiency. He states that when the best conductors were used, the discharge was sudden and violent, but when poor conductors were used, up to a certain point, the violence of the discharge was lessened. Iron was shown to be a better protection than copper, on account of a lower co-efficient of self-induction.

Messrs. Thos. McDonald & Co., proprietors of the Queen City Galvanizing Works, Toronto, and manufacturers of the Walters' patent metallic shingle, are making considerable additions to their works, and placing new machinery.

P. G. Close, H. Y. Ellis, P. W. Ellis, W. P. Ellis, Suzannah Jane Ellis and Sarah Ellen Moodie, all of Toronto, are incorporated as the Hungerford Marble Company, with a capital of $100,000. The company will commence mining operations in Hastings County.

A by-law will be voted upon by the ratepayers of St. Thomas on the 22nd to grant a bonus of $6,000 to Mr. Still, of Tilbury Centre, provided he removes his wood-working factory from that place to St. Thomas, and employs an average of forty hands for a period of ten years.

There is talk of a company being formed in Toronto to engage in the manufacture of scoriated brick. The promoters of the enterprise are Messrs. J. J. Davidson, J. D. Hay, and Beverley Robinson. A test of these bricks for paving purposes will be made on Toronto streets.

A very fine mahogany stain is made by boiling in one gallon of water, eight ounces of madder and four ounces of fustic. The old rule is to streak the wood before it is quite dry with black stain to produce the grain of mahogany, but some kinds of wood give much better results when finished by the process recommended for the antique oak surface.

The *American Cultivator* recommends mixture of hydraulic cement and skim milk for painting farm buildings and fences. The cement is placed in a bucket and sweet skim milk stirred in until the mixture is of the consistency of cream. The proportions are about one quart of cement to a gallon of milk. Color may be added if desired. This paint is cheap and durable.

To restore mahogany, first wash well with soap and water, and then polish daily with the following oil: Take half an ounce of alkenat root, cut small, and add to a pint of linseed oil, then let this stand for a week, then add half an ounce of powdered gum arabic and an ounce of shellac varoish. Keep these ingredients standing by in a bottle near a fire for a week, and then strain off. When using, rub it well in.

Perhaps the most wonderful thing that has been discovered of late is the new glass which has just been made in Sweden. Our common glass contains only six substances, while the Swedish glass consists of 14, the most important elements being phosphorus and baron, which are not found in any other glass. The revolution which this new refractor is destined to make is almost inconceivable, if it is true, as positively alleged, that, while the highest power of an old-fashioned microscope lens reveals only the one four hundred-thousandth part of an inch, this new glass will enable us to distinguish one two hundred-and-four-million-seven-hundred-thousandth part of an inch.

PUBLICATIONS.

WE note with pleasure that our excellent American contemporary, the *Progressive Age*, will in future be published semi-monthly instead of monthly as heretofore. The publication offices, too, have been removed from Philadelphia to New York. The *Progressive Age* devotes itself entirely to gas topics, and is an ably conducted journal.

We have received from the author a copy of a "Manual of Engineers' Calculations," by D. McLaughlin Smith, late clerk of Steamboat Inspection Office, St. John, N. B. This work, which is designed to assist engineers desirous of passing the Board of Steamboat Inspection, contains rules for working and answering the kind of questions usually profounded to such candidates. The book contains many valuable tables and a number of illustrations. A beautifully engraved portrait of the author's father, Wm. M. Smith, M. E., forms the frontispiece to the book, and a sketch of his life is also found in its pages. Persons interested in the subjects of which this book treats will find its contents of great practical interest and value.

Our esteemed contemporary, the *Sanitary News*, has advanced its subscription price from $2 to $3 per year.

PERSONAL.

A. O. Wheeler, builder and contractor, of Toronto, has assigned.

Mr. Smart, Minister of Public Works for Manitoba, is seriously ill.

Messrs. Smead, Dowd & Co., furnaces, Toronto, have dissolved partnership.

Mattinson Bros., contractors, Spring Hill, N. S., have dissolved partnership.

Mr. B. A. Campbell, a prominent Canadian contractor, died recently at Niagara Falls.

At a recent meeting of the Toronto Master Carpenters' Association, Mr. Wm. Simpson was presented with a handsome and costly tea service and an address in recognition of his efficient services as Secretary of the Association during the past three years.

The following gentlemen have been elected officers of the Council of Arts and Manufactures of the Province of Quebec for the ensuing year:—President, Mr. S. E. Davison; Vice President, Mr. J. P. Fiche. Committee—Messrs. C. Dupuet, J. Carred, Lieut.-Col. Stevenson, Boivin and A. Lequet.

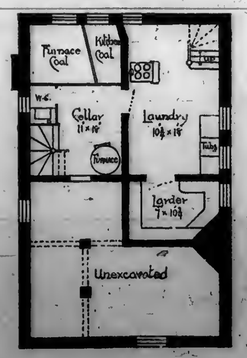
The solicitors of the Dominion Subway Company, Toronto, are seeking authority from the city to lay underground conduits for electric light and other wires.

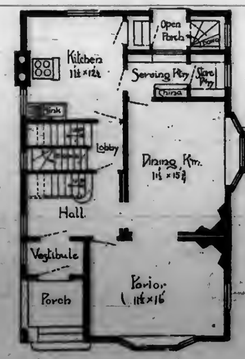
Ald. Hanley, of Belleville, Ont., has secured the contract for the carpenter work on the new $100,000 St. Paul's Catholic church, Toronto. He has also the contract for the carpenter work on the new Catholic church at Tweed, Ont., and is preparing plans for the new High School at Madoc.

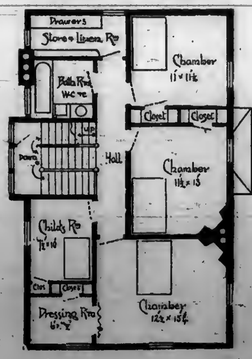
CANADIAN ARCHITECT COMPETITION-No I
for a
$2500 TOWN HOUSE
Design Submitted by "Dessin a teur"

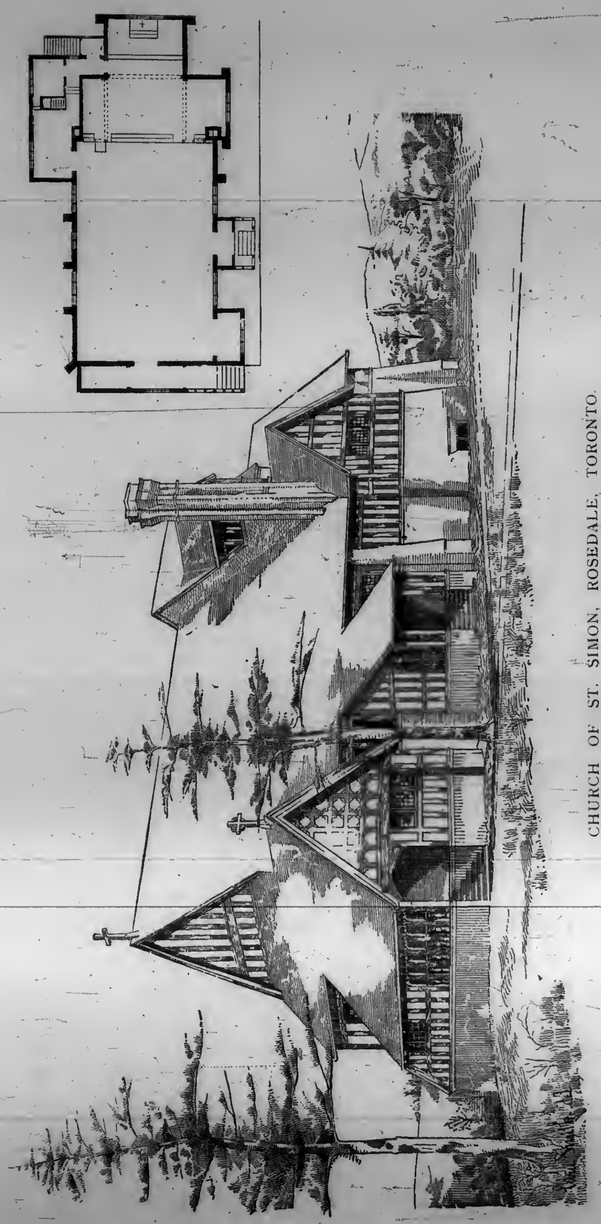
Scale for Plans-Elevations

N.B. The Servant's Room is in the Attic
The remainder is unfinished









CHURCH OF ST. SIMON, ROSEDALE, TORONTO.
STRICKLAND & SYMONS, ARCHITECTS, TORONTO.

PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No. VI. TORONTO, CANADA, JUNE, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

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C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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ADVERTISEMENTS.

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EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

WE wish to correct an error which appeared in connection with the report of the committee appointed to judge the designs sent in to the CANADIAN ARCHITECT AND BUILDER competition. The name of the gentleman who won both first prizes is "Horwood," not "Howard," as printed last month.

THE demands of advertisers upon our space are becoming so great that we shall be obliged to increase the number of our pages, in order to do justice to our subscribers, who are entitled to a full supply of information through the various departments of the paper. It is our purpose to increase the size of the paper as occasion demands, rather than encroach upon the space hitherto devoted to reading matter.

A SUBSCRIBER to this journal who is a manufacturer of materials used in new buildings, and is naturally interested in knowing where and by whom proposed buildings are to be erected, complains that the list of permits granted for new buildings in Toronto and published in the CANADIAN ARCHITECT AND BUILDER, is robbed of much of its value by the fact that many of the buildings are well under construction before the permit is obtained. Other serious objections to the system of issuing permits after instead of before construction begins, were pointed out in these columns last month. It is time that the present practice should be reformed.

IF there was a law compelling people to build at an agreed upon distance from the street line, it would give a much improved appearance to the streets of our cities. The petition of say two-thirds of the property owners on any street should be sufficient to cause the Council to define the distance from the street line at which houses must be built. There are many streets in our Canadian cities which are ruined in appearance by some of the houses being built close to the sidewalk line. At present if a man builds some distance back from the street he takes the chance of having his neighbor erect a building further forward than his own, and of finding himself thus entirely shut off from the street except the small portion directly in front of his house. With such a regulation as we suggest, a line of trees could be planted inside the fence as well as on the street, and the increased shade thus afforded would be of much value. House owners would also be enabled to use the lawns in front of their dwellings without the uncomfortable feeling that they were under the scrutiny of their neighbors and of the public.

OUR Pacific coast contemporary, the *California Architect*, is waging war against the lumber rings through whose operations it says the price of lumber is much higher than it would be if the demand governed the price. Our contemporary shows that building operations in San Francisco will fall far short of former years owing to the impossibility of getting lumber at a fair value. The *Architect* would very much like to see the import duty removed, which would allow supplies of British Columbia lumber to be brought into California and sold in competition with stocks held by the lumber "trusts."

IT is satisfactory to know that the railway companies have at last signified their purpose of placing guards at the crossings of the principal streets leading to the boat landings on the Toronto Esplanade. It may reasonably be assumed that had this action been taken five years ago, many lives lost during this period would have been preserved. It would seem that anything like a comprehensive scheme for the improvement of the Esplanade is still far distant, although it is a matter that demands immediate attention, and the neglect of which must lead to increased difficulties in the way of the ultimate accomplishment of the desired object.

IT is satisfactory to learn that an understanding has been arriven at between the Master Plasterers and their employees in this city, by which it is hoped the question of wages may be considered settled until April of next year. It now seems reasonably certain that the present building season in Toronto will be allowed to pass without a strike, and it is well in the general interest that such is the case. The amount of building in progress, owing principally no doubt to the scarcity of money, and the difficulty of obtaining loans, is far short of anticipations. We are informed that many workmen are walking about the city unable to get employment. Speculative building has been very much reduced in extent, and the few large structures in course of erection have only as yet reached the stage where employment can be given to stone cutters, masons and laborers. Under such conditions, workmen will consult their own interests as well as the general good by being reasonable in their demands.

ALTHOUGH there are generally more men to do the work that offers than are required, there are never more capable men than can find employment. While low down there is always a crowd and much struggling for positions, high up there is room, although not for the lazy or incapable. It is a very rare thing indeed to come across a foreman of any of the building trades who is as good a man as he should be. He may be a good mechanic, and yet unable to take the position of foreman through his inability to control men or understand the plans furnished him for his guidance. A man who can understand plans and yet is not a first class workman does not make a good foreman once in ten times. Our advice to the young apprentice is, that he should make up his mind to become at least a first-class foreman. If he does, and works hard, he will secure wages that he can never obtain as an indifferent mechanic, though he should have a dozen trade unions at his back. There is room at the top for good men as foremen, with the accompanying results in the shape of large wages.

WE note with pleasure that at an enthusiastic meeting held in Kingston a few days ago, it was decided to attempt the establishment of a School of Practical Science and Agriculture. The projectors of the undertaking state that the school it is proposed to found will not make skilled mechanics of those who attend it—it is not proposed to do so—but it will give their education a practical trend; it will give them an understanding of the nature of woods and metals and their properties, and an expertness with tools which will insure them a rapid promotion in the workshops; it will contribute to their expertness, and secure for them, as journeymen, a remuneration befitting their efficiency. They further state their belief that the need of the hour is the spread of practical information, such information as can be obtained only in a technical hall. It was remarked as a lamentable fact that the education given in the public schools was not practical enough. It tended to the professions; something was needed to train young men for other callings. We hope that success will crown this laudable undertaking, and that the youth of Canada will no longer require to go beyond the bounds of their own country to obtain the technical knowlege necessary to fit them for success in mechanical pursuits.

WE see it stated that Mr. Percy Wood, the designer of the Brant monument at Brantford, Ont., is at work on a sculptured monument which it is proposed to erect at Ottawa to commemorate the suppression of the Northwest rebellion. Mr. Wood resides in England, and is no doubt a clever artist. Without wishing to say anything in disparagement of him, we desire, however, to express our unhesitating opinion that there is no reason why work of this kind should be given to a foreigner over the heads of our native artists, and without giving the latter an opportunity of showing what they are capable of doing. The same may with as much truth be said of architectural designing. If the people of Canada, and especially those who have the bestowal of patronage of this kind, desire or expect to see this country make satisfactory progress in art, they must display more loyalty toward native talent. If this course be not taken, and it becomes apparent that all the prizes worth having are handed over to foreigners, we shall not be able to retain in this country artists of first-class ability. Such a result would before many years react upon the progress and prosperity of the Dominion, and indirectly at least upon the interests of those whose unpatriotic conduct had brought it about. Let us give every encouragement to the development of Canadian ambition and talent, and thereby assist in making this country the pride of Canadians.

THE newspaper accounts of the disastrous conflagration which took place a few days ago at Hull, P. Q., reveal a state of things by no means creditable to the residents of that unfortunate city. Two scourgings should have been sufficient to teach the people of Hull that a city constructed largely of wood requires the most perfect fire-protecting apparatus, and above all, a fire brigade thoroughly equipped and trained to act promptly and intelligently when the emergency demands

their services. The appliances and fire brigade that were unable to prevent the spread of fire from a building standing isolated in an open square, must certainly have been of the poorest description, and the people showed culpable carelessness regarding the safety of their lives and property, when they entrusted both into such hands. The firemen were utterly disorganized, and did little more than add to the excitement of the occasion. So completely did they "lose their heads," that in moving from one point to another they left the caps off many of the hydrants, and the great volume of water which thus escaped soon reduced the pressure to a point where it became useless for fire purposes. The grief of the Roman Catholics upon witnessing the destruction of their beautiful cathedral which they supposed to have been fireproof, was very touching indeed. The value of the structure is placed at $160,000. It was built of stone, with sheet iron roof and cupola. The condition of the two thousand people whom this fire has left homeless and almost without shelter calls for sympathy of the most practical kind. We trust that this tirice repeated calamity which has befallen their city may lead the people of Hull to adopt common sense methods for the prevention of such catastrophes in the future.

SOME very bad management is exhibited by the Toronto Public School Board in connection with the building of new school houses. A case in point is a new school house at present under construction near Dufferin street in the western part of the city. This school house has only four class rooms in it, which in itself is not objectionable, if any provision had been made for adding four more in the future. There is no doubt that inside of two years this school will have to be enlarged to an eight room school, and this can only be done by tacking on the rooms in any manner possible. A design for an eight room school should have been adopted, which would have admitted the erection of four of the rooms now and the other four later on. While we are on this subject we would like to offer a suggestion, which is, that a plan for the city schools should be adopted and improved upon as far as possible in the future as experience may teach, and all schools built according to such plan. We would not have the elevations similar by any means; but would advocate as great a diversity in the elevations as there are schools, so long as they were artistic. So far there has been a very great diversity in the plans and a wonderful similarity in the elevations, for they have all been alike bad until within the last year or two. Some of the plans have been very good indeed, but the greater number have been extremely bad. There is not the slightest reason in the world why they should not be all good, and that could be best brought about by adopting a good plan, and building all the schools according to that plan. It might be necessary to change the plan slightly in each case to obtain the necessary diversity in the elevations. In conclusion we may say, that some of our supposed best planned schools are really inferior to others which are regarded second in order of merit.

THE Public School Board of Toronto has discredited itself by the manner in which it has gone about the appointment of an Inspector of School Buildings. Instead of making the appointment solely on the ground of the fitness of the applicant to perform the duties of the position, politics, personal friendships and such like considerations have been the influencing factors. The names of two candidates are before the Board, and the votes of the members appear to be about equally divided between them. For a couple of months past the contending factions have been exercising their greatest ingenuity to outwit each other, and by some means secure the election of their respective candidates. Several of the regular meetings of the Board have had to be abandoned for want of a quorum, because it did not suit the purpose of certain members to be present. Thus the legitimate objects of the Board and the educational interests of the city are made secondary to the desire of the members to put their favorites in office. One portion of the Board, and we understand the majority, support the appointment of Mr. Bishop, while the other portion support Mr. Downey. We believe that Mr. Bishop would have been appointed long ago if it were not the supposed intention of his supporters to make him architect of the Board instead of building superintendent. His opponents claim that while he may make a very good superintendent he would not be a suitable man for the position of architect. We are inclined to think that Mr. Bishop is a better man than Mr. Downey for the position of superintendent. That he would make a good architect we very much doubt. We have knowledge that it is his belief that he is to be practically architect to the Board, as he has been making some statements as to the works on school architecture which he proposes to study, etc. Now to be a superintendent is one thing, to be an architect is another; and if Mr. Bishop is to assume the duties of an architect, we oppose his appointment. The Public School Board, if it appoints an architect, should appoint a young man of decided abillty and education, who will be young enough to enter on his duties with the energy characteristic of youth, and with vim enough to fight for new principles against those of the past.

MANY of the principal Canadian towns have adopted systems of waterworks during the last few years. We notice that in many instances municipalities do not purchase the plant and operate the system, but the ownership and control of the same remain in the hands of the company which puts in the plant, the town paying a sum yearly for its water supply. It appears to us that it would be much more advantageous to these towns to own and operate their waterworks systems. A company will not put in a plant and supply a town with water for a certain amount without being assured that a fair profit will accrue to itself after paying the cost of maintenance. This being the case, there should be no reason why each town might not own and operate its own system, and instead of handing the profits over to a company, put them into the municipal treasury for the benefit of the citizens. The waterworks department ot the city of Toronto contributes a very large amount yearly towards defraying the cost of municipal government. Every year the profits derived from this source increase in volume. Would it not be a foolish thing for the City Council to allow a private corporation to control our waterworks system and grow rich at the expense of the citizens? The same view holds good in the case of smaller towns and cities. The people of Brantford have been figuring on this matter, and a local paper states the result as follows: "The question that will likely agitate the minds of citizens very soon is whether or not the city will own the new waterworks. It is thought that the work will cost in the neighborhood of $150,000. This money can now be obtained on the British market at 4 per cent., or the whole sum for an outlay of $6,000 per year. The rate which any company have so far proposed to charge the city for hydrant use is in the neighborhood of $7,000 per year, so it would seem to be a clear saving of over $1,000 per year for the city to own the waterworks. All the cities in Canada that own waterworks systems have found them profitable investments. There is no reason why the city should not reap this benefit rather than let the profits go into the pockets of shareholders who may happen to live in some other city than Brantford." When a town hands over the control of its water supply to a company the latter is in a position to dictate its own terms, and sooner or later the citizens will find that they have made a grevious mistake.

A WALK through the northwest part of the city of Toronto is sufficient to cause astonishment at its tremendous growth. In the last two years ground that was then laid out in farms has been covered with houses. Where and how this rapid building up of the city is to stop, it is difficult to say. Some people seem to think immediately, and yet, although in their opinion the time is so close, it is like to-morrow always one day off. But it was not to speak of the growth of the city that we set out, but of the indifference shown by the people to this wonderful increase. Streets are laid out without one thought of the future, every attention being paid to obtaining the greatest possible number of feet at the highest obtainable price per foot. There is almost no attempt to provide parks or small gardens amidst the interminable stretches of streets, and where it is done, one hardly knows whether to be glad or sorry. We understand that just east of Dufferin street and south of the railway, a plot of ground has been dedicated as a park, on which there is not a single tree. There would not be any objection to this, if it were not that just north of this proposed park, on the other side of the C. P. R. tracks, there are a number of acres of beautifully wooded ground which would require but little to make them into one of the most beautiful parks in the city. We are not positive that this ground is in the city, but if it is not, it soon will be. Here we have a beautiful wood divided into small lots, the owner ot which must cut down a large number of the trees to obtain space on which to build, and at the same time within one quarter of a mile we have a treeless piece of ground devoted to park purposes, which it will take thirty years at least to change into shady groves and winding paths. How does it come that all our opportunities are allowed to slip through our fingers like water through a sieve? Can it be that we as a people are not astute enough to see advantages when they offer, or is it an indifference to the general good if the personal interest is not benefitted that results in our neglecting opportunities that will offer but once. If we lose the Queen's Park we will be without any open ground except in the extreme east and west of the city. Small parks at close intervals are a thousand times more beneficial than the same amount of ground in large plots miles apart. In this city where street cars do not run on Sunday (and we are of those who hope never to see them running), it is impossible for the greater portion of the inhabitants to take any enjoyment out of large parks miles distant. What is wanted is the small square of ground covered with grass, having flower beds and large shade trees, at close intervals throughout the city. We are also advocates of the large parks, but let us first have the small ones, and then the large ones will follow. These parks could all be less or more connected by drives. We would strongly advocate the appointment of a Park Commission which should have the power and ability to work up, adopt and carry out a noble and generous scheme for supplying our people with pleasure grounds, breathing places, and at the same time glimpses of nature to aid in their intellectual and moral improvement.

PERSONAL.

Anclair & Co., painters, Quebec, have dissolved.

T. Charpentier & Fils, builders, Montreal, have dissolved.

Phillips & McLeod, planing mill operators, Aurora, have dissolved.

Geo. Wiley, carpenter, of Kingston, Ont., has fallen heir to $15,000 by the death of an uncle in England.

Mr. Robt. Forsyth, of Montreal, has threatened action for damages against the city of Toronto for alleged violation of contract.

Collingwood Schreiber, chief engineer of Government railways, is at present in Nova Scotia making an inspection of the roads there.

Mr. A. Gobeil, Secretary of the Public Works Department, Ottawa, is at present on the Isle of Orleans, Gulf of St. Lawrence, seeking to recover his health.

Mr. Fred. Thompson, electrician of the Royal Electric Co., Montreal, has been invited to lecture before the Art Association of Sherbrooke, Que., upon "The Wonders of Electricity."

Hon. G. W. Ross, Minister of Education for Ontario will visit the United States with the view of acquiring information regarding the method of conducting schools of science and practical engineering.

Mr. T. R. Hewson, C. E., of Belleville, is said to be considering an offer from the Government of Japan to go to that country for seven years, to superintend railway construction. It is understood he also has an offer from a railway in Utah and Colorado.

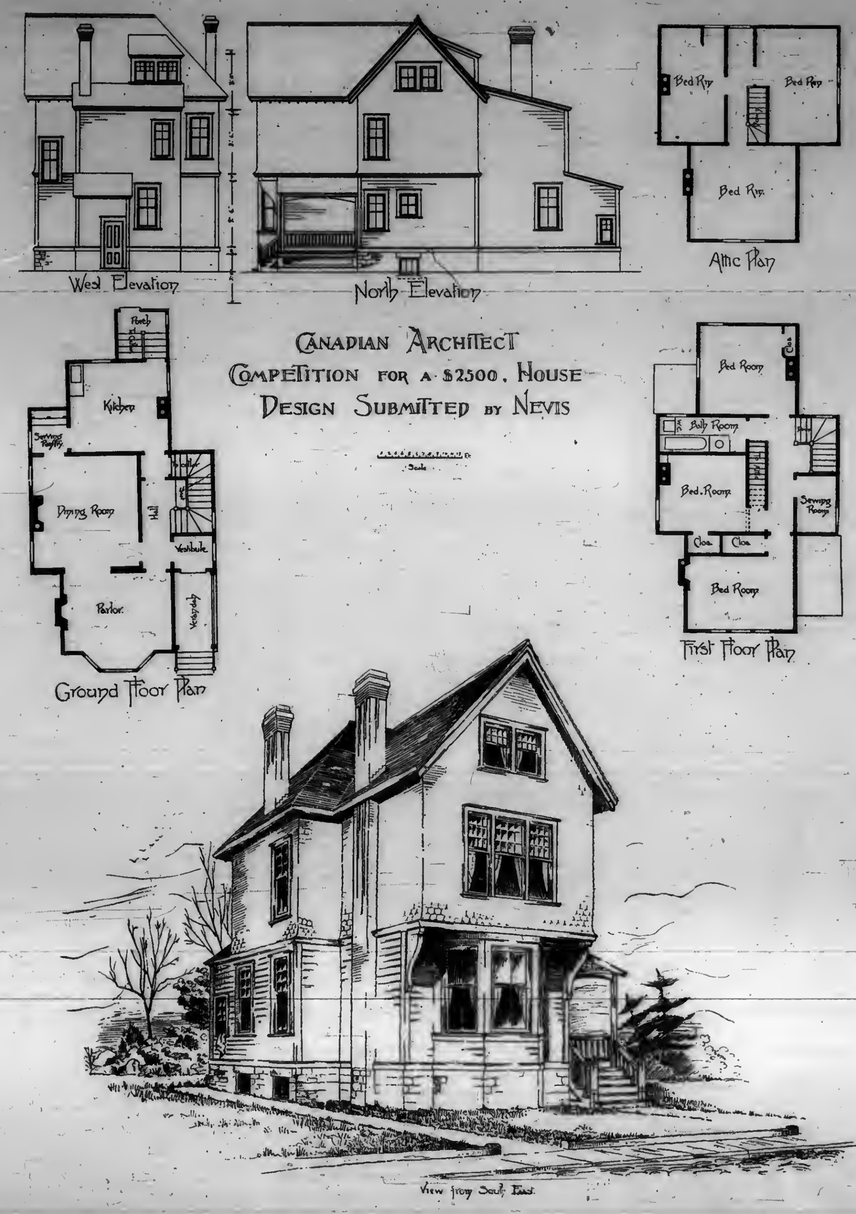
The many friends of Mr. Thos. C. Keefer, C.E., K.C.M.G., of Ottawa, have learned with deep regret of the accidental death of his daughter Jessie, who was drowned while endeavoring to rescue her two nephews who were carried away by the current and lost their lives while bathing in the river.

We learn from the *Progressive Age*, New York, that Mr. John Fensom, of the Fensom Elevator Works, Toronto, Ont, and a party of friends were out sailing on the Passaic river recently, on Prof. F. Reckenzaun's new electric boat "Magnet." This boat is equipped with storage batteries of the Electrical Accumulator Company, of New York, and is the first electric boat carrying the American flag. Mr. Fensom was greatly interested in the success of the trial.

FAULTY CONSTRUCTION.

THERE is urgent need of some intelligent control of building construction in this city. One who has a knowledge of construction will see much in the erection of our buildings which is faulty. He will also notice occasionally construction which will astonish him very much, and make him wonder if the building of our buildings is left to the whim of ignorant men. Piers of brick 9 inches wide may be seen carrying brick joints two or more storeys high. Iron columns so attenuated that they can only be likened to columns of needles are placed under joists of two and three storeys in height. Built up columns of scantling nailed together may also be seen carrying uncommon loads. Breast-summer of wood and iron are made to span openings much beyond their safe carrying capacity. In fact almost any construction is not apparently too risky or dangerous to be adopted in this city.

No man having any knowledge of construction would place any weight on a 9 in. brick pier ten or twelve feet high, and yet it is done every day in this city, and that with the sanction of the Commissioner of Works. Neither would any one place a heavy load on a column of more than thirty diameters. It is safe to state that there have been few columns placed in position of late which were under thirty diameters, and yet such a column requires a factor of safety of ten according to competent authorities. That a factor of ten has been allowed no one would be foolish enough to imagine. It is really a question of how many of them have any factors at all. That they do not give way under their loads will be sufficient proof in the opinion of those ignorant in such matters, but not of experts. When a column gives way it only proves that it was defective in the material, or that it was ten times too weak to carry the load imposed upon it. There have been a number of accidents in this city during the past few years, due to the ignorance of our builders or supposed architects. Fortunately none of these have resulted in loss of life, (although most serious injury has resulted to a number of men,) or we would have had some notice taken of this most important matter. It would seem that we must wait until several lives have been lost before action will be taken to check improper methods of construction. Much as we would like to have some action taken, we prefer to have things remain as they are if it is necessary to have action only as the result of death through the ignorance of those who should know and do not, and who should not be allowed to work in ignorance, except at that which cannot cause loss or suffering to their fellow men.



THE RECENT ART EXHIBITION.

GROTESQUES

THE combined exhibition of the Royal Canadian Academy of Arts and the Ontario Society of Artists was opened on the evening of May 7th, and closed with a ball on the evening of Friday the 25th of May. The exhibition was a highly creditable one, and showde the great advancement which has been made by Canadian artists during the last few years. There are many works of high merit, and many others which would have been of equal excellence if their authors had devoted the careful study, and conscientious work to their pictures which they are quite capable of doing. There is more than one picture which has suffered severely through carelessness in the finishing of some parts of the work. It is exceedingly annoying to see a picture which has had some exquisite drawing and coloring, almost ruined by the bad drawing or color of the balance of the work. It would be better for an artist to exhibit but one work, and that the result of preserving and laborious effort, exemplifying the best that he can do, than to show three or more works having among them all only sufficient value to constitute one good picture. It is also better to carefully and well paint a small canvass than to give value to but oasis in the surface of a large one. There is no doubt but the attempt to do too much is caused to a very large extent by the lack of appreciation of good work, and the impossibility to sell a really valuable work at its proper value. Small pictures carefully and conscientiously handled, should bring somewhere near their value, and they would serve to educate the people in good and vigorous art. A large picture which does not in all its parts represent the best work which its painter is capable of doing, will not serve to educate a people in art. Then by all means let us have from each artist in every instance the best work which he is capable of doing. It should not be necessary to judge a man by what he *can* do under certain conditions, but by what he *does* do. In the long run a man will be judged by what he accomplishes, and not by what he might have accomplished if he had had the ambition and preseverence to have worked as he should have done. Ambition is very weak when it does not spur a man on to work to the utmost of his strength to gain the top rung of the ladder of fame.

We give below a list of some of the most valuable of the pictures exhibited. It may not be a full list, as no doubt there were others which deserve mention and which are not included. There are also many pictures which we should have noticed because of their very superior excellence in parts, if it had not been that they were equally inferior in other portions. It must of course be understood, that we are not an infallible art critic, and that what we may praise may be bad, and what we condemn may be good. We only hope that we may be somewhere near the average opinion of those capable of judging in matters artistic.

No. 14, "Mt. Sir Donald, Macdonald Valley," by L. R. O'Brien; this picture is full of radiant color and superior technique. No. 19, "Divided," by F. C. V. Ede, is a clever sketch in the Italian school. No. 21, "Walna Scar," by C. S. Millard, although not attractive as a picture, contains masterly effects of light and shade and perspective. No. 24, "Morning Mists, Ross Peak Valley," gives one the impression that it is a study for a picture, rather than a finished work; it, however, is a good example of this artistic ability in the handling of washes. No. 30, "Cloudland—view from the Terminal Mountains from the Selkirk Glacier by L. R. O'Brien, a very careful piece of brushwork, but the atmospheric effects almed at fall short of the intention. No. 32, "A Dark Pool on a Dull Day," by D. Fowler, is a drawing which reminds one of Constable; it is a poetic work representing a dark pool on a dull day; the effect of the reflected foliage is a pleasure to look at, especially on account of its apparent ease of treatment. No. 33, "Peril on Route," by L. C. V. Ede, is a purely academical study full of good drawing; the oxen are particularly well drawn. The figure looking out of the picture, however, is dwarfish in comparison with the principal figure. No. 42, "Mount Carrol, Roger's Pass, B. C.," by F. M. Bell Smith, is one of the most charming and poetic pictures in the exhibition; it is full of interest and atmospheric effects; we regret that the bottom right hand corner is most carelessly handled, which mars an otherwise clever and faultless painting. No. 44, "Cottage near Llanberis North Wales," by C. Stewart Millard, is an excellent example of this artist's work; it represents a laborer's cottage built of stone with a moss covered roof. No. 45, "Mid-day Shade," by J. Spooner, is full of sunlight and effective natural shadows; it is one of the best pictures of this artist, rich in colors, well drawn and full of careful work; it is a picture which fills the beholder with pleasure and delight. No. 49, "The Crest of the Rockies at the head of Bow River Pass," by L. R. O'Brien, is one of the most carefully detailed pictures on the east wall; it is extremely natural and full of good conscientious work. No. 53, "The Day's Decline;" the same may be said of this picture. The laurel certainly rests between the president and Mr. F. M. Bell Smith in the water color exhibit. No. 56, "A Breeze, Casco," by F. M. Bell Smith; this picture is strong in the foreground, which represents a rocky shore covered with sea-weed and the breakers being dashed into spray on the rocks; in other parts this picture is weak. No. 59, "Toiling over the Sand Hills," by D. Fowler, is a landscape well handled, but nothing can be offered in excuse for the intensity of the blue in the sky and water. No. 73, "Road Through High Park," by Jas. T. Rolph, makes one wish that there were more pictures from the hand of this artist equally meritorious. No. 77, "Sunshine and Shadow," by G. A. Reid; it is impossible to speak of this work as a picture, but decoratively it is good. No. 81, "Grey Day in July," by Homer Watson; the wheatfield is too solid in effect and does not convey to the imagination the idea of the field being composed of individual blades, which seriously injures an otherwise strong work. No. 82, "Saw Mill," by Homer Watson; in this picture Mr. Watson is seen to better advantage; the effect of gloom, however, is too intense, and the general effect would have been greatly improved by lighting the middle distance and certain parts of the foreground; there is neither a sufficient volume of water nor rapid descent to cause the commotion shown in the moving water; the large tree which we presume is intended for an oak is too coarsely painted. No. 83, "Narcissus," by A. F. W. Haywood is a very tender and truthful work. No. 91, "Portrait Sir John Macdonald, 1886;" no finer work has ever been exhibited by a Canadian artist than is expressed in the head and bust portions of this portrait; the effect of color is pleasing and natural, but we regret that sufficient attention has not been given to the drawing of the arms and a portion of the coat. No. 97, "Flowers," by A. F. W. Hayward; while one is looking at this work the imagination might easily convince the beholder that he was not only enjoying the sight of beautiful flowers, but also their delicious perfume; it is a simple little picture and has the appearance of having been but a work of pleasure. No. 108, "Road through the Fields," by Homer Watson; this picture is one of the best of the artist's works exhibited in this exhibition; it does not show any desire to cover canvass, but a love of Nature and an earnest desire to portray it truthfully. No. 112, "Little Gossips," by Robert Harris; this picture represents two young girls seated on a sloping beach with a village on the side of a hill, in the distance. The figures are beautifully composed and full of motion, altogether it is a very clever work. No. 123, "Pas Derrier Chez Mon Pere," by W. Brymner; this is one of the cleverest pictures in the exhibition, but it is evidently unfinished. No. 124, "The Guitar Player," by M. H. Reid; this work is semi-Flemish in feeling, and is carefully drawn and cleverly painted; the various textures are well readered. No. 127, "Father will Return" by Paul Peel; an ambitious work representing a child seated in a wheelbarrow playing with a wisp of hay, while its mother stands near by leaning on a scythe and anxiously watching for the return of the father; the child is spiritedly drawn but the mother is rather inanimate. No. 149, "Portrait of Mr. Jacob Spence," by J. W. L. Foster, is a fairly good portrait well handled. No. 167, "Col. Gzowski, A. D. C. to the Queen," by A. D. Paterson; generally this is a good portait and an excellent painting with superior color values; on the whole we prefer this artist's portrait of Sir John A Macdonald, No. 169, "The Meadow Lark," by Paul Peel; one of this artist's smallest and at the same time best pictures exhibited; it represents a field scene in the summer time; the female gleaner stands near by a wheel-barrow, on which sits her offspring intently peering into the distance, evidently attracted by an object of more than usual interest; the effect of sunlight is worthy ot notice. No. 170, "Drawing Lots," by G. A. Reid; this picture is attractive, but yet objectionable; first for its startling color, secoodly for its defective drawing; this class of work when it is so pure in color should be faultless in drawing. The length of limbs, especially the legs, will not bear comparison one with the other; much could have been made of this picture, it is a happy subject; but there is not sufficient differeace in the three figures in the painting. No. 172, "Friends," by Robert Harris; one of this artist's clever character sketches, representing possibly an English navvie after a hard day's work seated at home apparently enjoying the company of his dog; the dog, which is placed in front and looking directly out of the picture, is sparkling with genius. No. 174, "Portrait," by Hugh de J. Glazebrook; this work is superior, first, for its poising of the figure and property effects, next for its drawing, but which, however, we regret is defective on the right side of the figure; there is not the refinement and poetic feeling which we noticed in Nos. 91 and 167. No. 175, "Harmony," by Robert Harris; had we our choice of pictures in this highly creditable exhibition we would choose No. 175, which is one of the smallest canvasses exhibited. It represents a young lady seated at a piano. The action of the figure breath of Nature in every detail; the flesh seems as if it would yield to the touch; the draperies seem as if they would fall into as pretty folds if they should be disturbed; this picture would be considered a gem in any gallery on account of its purity and simplicity. No. 185, "Studio Interior," by G. A. Reid; this oil picture sparkles with good work; it represents the interior of a studio, and almost comes next to Mr. Harris' picture, although by no means as refined in detail.

We hope that the next Art Exhibition in this city will be beld in a building designed and built for the purposes of the Royal Canadian Academy, and that the paintings then exhibited will show a progress in art greater even than that displayed at the Exhibition just closed.

LIST OF ARCHITECTURAL BOOKS IN THE TORONTO PUBLIC LIBRARY.

IT is doubtful wether the architects and builders of Toronto are aware of the large amount of literature written for their information and at their disposal in the Toronto Public Library. In the interest of our readers we publish a complete list of these books, as follows:—

"Les Promenades de Paris, Bois de Boulogne, Bois de Vincennes," by A. Alphand, "Dictionary of Architecture," by William J. Andsley; "Lectures on Architecture," Edward M. Parry; "An Analysis of Gothic Architecture," R. and J. A. Brandon: "Parish Churches," Brandon, Raphael and J. Arthur; "The Carpenter's Assistant," W. Brown; "L'Architecture," L. Camna; "Village and Farm Cottages," W. and J. Backus W. Cleveland; "Palais, Maisons and Vues d'Italie," P. Clocbar; "L'Architecture Privees," M. C. Daly; "Horticultural Buildings," F. A. Fawkes; "History of Architecture in all Countries," "Palaces of Nineveb and Persepolis," "The Temples of the Jews," James Ferguson; "Cave Temples of India," J. Ferguson and J. Burgess; "Constructive Art in Italy," Geo. T. Fort; History of Architecture," Edward A. Freeman; Architectural Ironwork," Wm. J. Fryer, jr.; "Les Plus Beax Edifices de la Ville de Genes et de ses Environs," M. P. Gauthier; "Churches of Kent," Sir Stephen Glynne; "Architecture," (in his "British Literature and Art,") J. M. Graham; "Monumenti della religione Cristiana de Roma," J. G. Gutensohn and J. M. Knapp; "Encyclopedia of Architecture," Joseph Gwilt; "Designs for Parish Churches," J. Coleman Hart; "Natural Principles and Analogy of the Harmony of Form," Dr. R. Hay; "Modern Dwellings," H. Hudson Holly; "How to Build, Furnish and Decorate," "Garden Architecture," John A. Hughes; "Tombeaux de Louis XII. et de Francois I," E. F. Imbard; "Dalmatia, the Quarnero and Istria," T. G. Jackson, "Architecture in Europe," J. Kenrick; "Compendium of Architectural Sheet Metal Work," A. J. Littredge; "Ecclesiastical Architecture of Italy," H. G. Knight; "Architecture," Choix de Nouveaux Modeles de Serrurerie," E. Loconte; Un Album D'Architecte," E. F. Le Preux; "Farm and Villa Architecture," J. C. Loudon; "Architecture, Toscane," A. G. Montigny and A. Famin; "Japanese Homes and their Surroundings," E. S. Morse; "Notes and Sketches of an Architect," Felix Narjoux; "Mediaeval Architecture," Wm. Nesfield; "Sketches for Country Residences," E. Newton; "Studies in Mercantile Architecture," Wm. S. Ogden; "Gothic Molding," F. A. Paley; "Introduction to the Study of Gothic Architecture," John Henry Parker; "Earliest Egyptian Architecture," G. Rawlinson; "Picturesque Designs for Mansions, Villas Cottages, etc.," C. J. Richardson; "An Attempt to Discriminate the Styles of Architecture in England from the Conquest to the Reformation," T. Rickman; "School Architecture," "Masons" Bricklayers" Plasterers' and Decorators' Practical Gufde," R. Robson; "Seven Lamps of Architecture," "The Stones of Venice," John Ruskin; "Rise and Development of Mediaeval Architecture," Sir Gilbert Scott; "Practical Masonry," E. Shaw; "City and Suburban Architecture," "The Model Architect," S. Sloane; "Ornamental Interiors," J. M. Smith; "Gothic Architecture in the Middle Ages," V. Statz; "House Architecture," J. J. Stevenson; "Early Christian Architecture in Ireland," Margaret Stokes; "Dictionary of Architecture," R. Stuart; "Examples for Roofs, etc.," E. W. Prendall; "Discourses on Architecture," "Military Architecture," Eugene E. Viollet le Due; "Vitruvius Britannicue or the British Architect," Campbell, Woolfe and Gandon; "Architects' Pocket Companion and Price Book," Frank W. Vogdes; "Spires and Towers of the Mediaeval Churches of England," C. Wickes; "Architectural History of the University of Cambridge," R. Willis and R. W. Charles; "Architecture in England," "Architecture in Japan," "Hospital Plans," "Terms frequently used in Works of Architecture," "Architectural Director, or Pocket Vignola," "Building," Beckett; "Companion to Gothic Architecture," "Gothic Ecclesiastical Architecture," Bloxam; "Treatise on Limes, Cements and Mortars," Burnett; "Materials and Construction," Campin; "Joints Made and Used by Builders," Christy; "Village and Farm Cottages," Cleaveland and Backus; "Handrailing and Staircasing," Creswell: "Handbook of Elementary Art Architecture," D'Anvers; "Gothic Stonework," "Building Construction," Davidson; "Foundations and Concrete Works," "Masonry and Stone Cutting," Dobson; "Wonders of Architecture," Donald; "Church, Parsonage and School Architecture," "Economical Cottage Builder," Dwyer; "Architecture," Garbett; "Useful Architecture," Halfpenny; "Building Stones," Hull; "Building a Home," Oakey; "Building Surveying and Architecture," Smeaton; "Classic Architecture," "Gothic and Renaissance Architecture," Smith; "Lighthouses," Stevenson, "Science of Building," Tarn; "How to Build a House," Viollet Le Duc; "The Consulting Architect," Kerr; "Ventilation and Warming of School Buildings," Morrison.

OUR ILLUSTRATIONS.

BUILDING FOR MR. WILSON, GRAIG STREET, MONTREAL.

THIS building which is to be used as a warehouse, will consist of basement and seven stories 61x22 feet, and will cost in the neighborhood of $70,000. It will be built in red Perth sandstone, pressed brick and terra cotta. The names of the contractors are as follows: Stone, T. Barbeau; carpenter, J. Roberts; painter, Jas. Usherwood; plumbing, Hughes & Stephenson.

RESIDENCE FOR REV. PROF. GREGG, TORONTO.

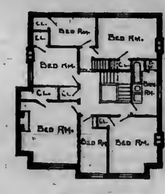
Residence of Rev. Prof. Gregg, Toronto, built in 1887, on the west side of Madison Avenue, near Bloor street on a lot of 50 feet frontage. The materials used were Credit Valley grey stone, brick and tiles, with half-timbered gables and slated roof. The cellar contains laundry and furnace and fuel rooms, and the attic, three bedrooms and store closet. Cost about $5,000. W. R. Gregg, architect, Toronto.

NEW RICHMOND STREET METHODIST CHURCH, TORONTO.

This new church, which is in course of erection on McCaul street, this city, is Romanesque in style, The dimensions of the auditorium of the church proper will be 70x83 feet; height, 50 feet; inclined floor and crescent-shaped gallery. The rool will be supported by four pillars. The seating capacity will be thirteen hundred. There will be five exits from the building; the main entrance being eleven feet wide. In rear of the church proper is a commodious lecture and Sabbath school room and class room. On the ground floor is the lecture room with a seating capacity of five hundred, which can be increased to six hundred by opening folding doors communicating with the committee room. In rear of the lecture room is situated the minister's vestry, library and lavatories. On the second floor, which is approached by two flights of stairs six feet wide, are the church parlor, class rooms, and infant class room, the latter furnished with tiers of crescent seats. Folding doors communicate with all the rooms. The building will also be supplied with a kitchen, range, hoist and all the necessary appliances.

GROUND FLOOR.

RESIDENCE FOR REV. PROF. GREGG, TORONTO.



FIRST FLOOR.

COMPETITION DESIGN BY "NEVIS."

When we named the northwest corner as the position on which we desired to place a proposed house, we had in mind certain requirements in relation to the position of the rooms. To meet these requirements we made the house front the south. "Nevis' has fronted his house to the east, and we must consequently judge his plan more from his position than ours. He has placed his stairs in the northwest angle which is a good position, but his entrance door is to the northeast, and a long way back from the front, which is objectionable. The parlor has a bay window to the east, and is a very well proportioned room. The door to the hall and the sliding door connecting with the dining room, are too near the angles to be satisfactory. The dining room is too wide for its length. There is no object in having a dining room any wider than will serve its purpose, especially where economy must be studied. The serving pantry is too small for practical use; it would make a very good dining room closet. The kitchen is fairly good, but we would have placed the window on the north side of kitchen to the east of the chimney, and thus secured better ventilation. The doors are also too much in the angles of the room, which prevents the wall spares being used, except beyond the swing of the doors. The porch is very well arranged, and serves its purpose admirably. It is better to have a landing outside of a door than to commence the steps at the door-step, but such advantages must often give way to economical ideas. One serious objection to this plan is, that there is no kitchen pantry or any other place for the storage of the kitchen apparatus. The three bedrooms are of very good size and will receive the usual bedroom furniture without crowding. The doors or windows do not interfere with the placing of the furniture. The closet to the front room is rather long and narrow, but to have placed the door in the side of the closet would have ruined the wall space in the room. The sewing room is very small, and the window should have been to the front instead of to the north. Windows should not be placed to the north if it is possible to give them any other exposure. In this case a north and side exposure is shown in preference to a front and east. In our opinion it would be better to remove the south partition of this room and take in the passage. It is not absolutely necessary to have the sewing room made strictly private, and when to do so makes it of very little use we would not make it a separate room, but make the hall sufficiently large, and use it for that purpose. This room would make a good linen room, and possibly it would be better to use it for that purpose. The bath room is too long and narrow, and the window should have been placed in the south end. A window placed as shown in the plan will not light the room nearly so efficiently as one placed as we recommend. An effort should be made to arrange a bath room to take the fixtures properly. It is not enough that the fixtures are in the room and can be used; they should also be arranged to give an air of spaciousness and adaptability. The attic bedroom appears to be of good size on the plan, but we are afraid the available space in the northwest room is very small. The window lighting in this room is bad and should have been to the south, even though the change should affect the elevation. The matter of economy affects many of the suggestions we have made, and possibly the designer considered that he was bound by the limit of cost, and would not allow himself to improve the plan through fear of exceeding the limit of cost.

The elevations are very good, and we will not offer any suggestions; besides it is more our object to criticize the planning. We cannot conceive of what material the kitchen roof is covered. If of slate or shingle, it is much too flat; if with pitch, it is far too steep. Galvanized iron or tin would answer, but some other treatment of this roof should be adopted. The roof as shown is a bad one, and is very objectionable in elevation.

TORONTO ART LEAGUE.

THE Toronto Art League is composed of a few enthusiastic art students who spent many pleasant and profitable evenings last winter in sketching from life. The approach of warm weather has rendered the continuance of these indoor meetings undesirable. As a substitute for them, a series of Saturday afternoon sketching parties have been arranged for. The first of these took place to the Humber last Saturday. The headquarters of the League are in the Imperial Bank building on Wellington street. The secretary is Mr. Dawson, Union buildings, Toronto street. Persons artistically endowed, who are in sympathy with the objects of the Art League, are invited to communicate with the secretary with a view to becoming members.

THE NEED OF ORGANIZATION.

EDITOR CANADIAN ARCHITECT AND BUILDER.

SIR,—In the hope of arousing discussion and drawing out practical suggestions that may be acceptable, and in the near future acted upon, I shall attempt to express my feelings on the subject of encouragement to native talent—the architectural phase of the National Policy. I do not claim to be disinterested, but if those who are most interested remain silent we cannot wonder at the indifference of others. This is an age of combines. It would seem indeed that, except the profession of architecture, there is no occupation, however high or low, without its association, convention or union; many further requiring examinations and registration. These associations when making their power felt may to outsiders seem objectionable, but to their members we must acknowledge their many accomplished and possible prospective advantages.

Why should not an architects' provincial or national association become as serviceable to its members? and if so, why should not the architects of this city at once take the first necessary steps?

There was, some years ago, a half-hearted attempt at organization, and I believe there now exists here a club or Guild; but without some distinct purpose or object, interest soon languishes and nothing is accomplished. In the United States, however, and in the newer and more rapidly developing sections more particularly, Architects' Institutes have within a very short time influenced legislation and molded public taste and morals, not only for their own benefit, but for the advancement of public interests, notably in drafting sanitary laws, in the conduct of competitions, and the erection of more suitable and creditable public buildings; the more honorable conditions having attracted the higher talent, and every architectural success is of lasting interest to the whole community.

My present purpose, though, is to urge the more selfish view, as perhaps more stimulating to determined action. I know of no city whose architects have more cause for complaint and protest than Toronto, where for some years past the very best buildings have been entrusted to foreigners, apparently without limitation as to expenditure or bargaining for reduction of remuneration. Is there no native ability if encouraged by such conditions? What about the Ottawa Parliament buildings, our Provincial University buildings, St. James' Cathedral, Osgoode Hall, etc., of a generation ago? Surely at this later day we have a right to expect more of a national sentiment, more encouragement for Canadians and encouragement of native talent. Is it lacking because we have no corporate society or name through which to make ourselves known, our wants supplied or our rights respected and enforced?

No foreign lawyer, doctor, or even plumber can do business here, much less secure the cream of what is going, but a foreign architect can and does without protest.

I venture to say that given the same opportunity, there are several Canadians capable of doing as good, and certainly as economical work, as a certain foreigner who bas been allowed unlimited expenditure in our midst, and though inclined to the Reform side of politics, I cannot imagine a more unpatriotic act by any government than that daily developing in Queen's Park. Canadians in competition hampered by most unreasonable conditions as to cost, unremunerated after repeated attempts at the impossible, criticized and contemptuously thrown out at the bidding of a foreign competitor possessed of no world-wide fame but unlimited "gall," posing, after years of intrigue, as a disinterested expert, then at once receiving the commission to design and erect as he pleases at any cost. Is it not time to combine and insist on some adequate preparation, some legal professional standing, and at least a national registration.

We have the records of what has been done in older countries, the more enlivening example of our Western

neighbors, and the proffered assistance of one who has experience, leisure and zeal. Have we not amongst us a sufficient number able and willing to undertake the active responsibilities necessary for organization and agitation until success be attained?

You, sir, deserve the thanks and co-operation of all interested, for the sympathy you have shown in your columns toward such a movement, and I trust you will not tire, but continue to incite to action those who perhaps only await leaders and an invitation to assemble.

Yours, &c.,

M. B. AYLESWORTH.

Toronto, June 9, 1888.

TORONTO ARCHITECTURAL DRAUGHTSMEN'S ASSOCIATION.

THE regular weekly meetings of the above association have been discontinued until the early autumn. We understand an effort is to be made to get the members together occasionally during the summer and organize sketching parties. This is a very commendable idea, and one which we hope to see carried out. A great deal of pleasure and profit might be derived by the students from sketching details for instance of some of our best Toronto buildings.

TORONTO ARCHITECTURAL GUILD.

THE ninth monthly dinner of the Architectural Guild, of Toronto, took place on Thursday evening, the 14th inst. There was a very large attendance of members, and a very pleasant evening was spent. Business of great importance was transacted, and which we hope will result beneficially to the Guild.

The principal matter under consideration was the conditions of the proposed competition for the Board of Trade building. The opinion of the majority was that, taken as a whole, they are exceedingly good conditions, and that the competition should result satisfactorily to all concerned. The objections raised did not really refer to the conditions. Very general satisfaction was expressed that Prof. William R. Ware, of Columbia College, had been appointed to act as the professional adviser to the Building Committee, and that he had consented to act. We believe that the Building Committee, when the competition is over, will be satisfied that their action in requesting Prof. Ware to act as professional adviser was the best policy which they could adopt to bring about a satisfactory competition.

The Guild also decided to keep up the monthly dinners, but that during the summer months they should be held at some of the many summer resorts which have sprung up about this very rapidly growing city

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The curriculum of the new School of Practical Science which it is proposed to establish at Kingston, Ont., will include architecture.

Fifty years ago last Wednesday, says the *Ontario*, the corner stone of the Belleville court house was laid by the Masonic order, and the occasion was a big demonstration in what was then a small village on Meyer's creek.

A Brantford paper facetiously remarks that their city hall would easily pass for a 12th century ruin, while a Hamilton contemporary declares that the ambitious city has some archaic verandas whose origin judging by their appearance, must date back to the time when Rameses II. was making mud pies on the banks of the Nile.

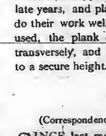
Several changes in the design for the new C. P. R. station at Montreal have been decided upon. The height of the tower will be increased from 100 to 152 feet, and will enclose a clock. Trains will arrive under cover, and the iron covered sheds in which passengers will alight, will be warmed by steam.

One great advantage which a village has over the city, says Archibald MacMechan in *The Week*, is that the building contractor has rarely exercised his mischievous activity there. The villager builds his own house to suit himself, as his needs, tastes, circumstances dictate; and so where you do not get picturesque effect you get the first element of it at least—variety.

The United States Government contemplates the erection of a large number of new post offices and other public buildings, the expenditure on which would be in the neighborhood of $21,000,000. The American Institute of Architects and the Western Association of Architects are endeavoring to have some of the designs for this work thrown open to public competition. They claim that the Government's supervising architect and staff could not possibly do such a vast amount of designing, and even if they could there would not be secured the variety of design which is so desirable and which an open competition would ensure.

FOUNDATIONS OF BUILDINGS IN MANITOBA AND THE NORTH-WEST.

BY R. BOURNE, C. E.



TO refer to the first importance of this subject to a builder in any country is needless; but in the vast and rapidly filling territories named above, the advantage of gaining a thorough and well-tried knowledge of this matter can scarce be over-estimated, especially as the theory and practice hitherto had in it are both naturally crude and experimental.

Further, the difficulty of arriving at a right conclusion as to the best kind of foundation to be used here is much increased,—1st, by the poor supply of Nature's foundations; 2nd, by the nature of the climate; 3rd, by the expense attending experiments in this direction. For these reasons several of the most costly and carefully erected structures have seriously failed from the sinking of the foundations, generally under a limited part of the building. As to the first impediment named, viz., the natural strata, it may be well to state that they are:—1st, a rich black loam, in depth from 6 to 14 inches; 2nd, a yellow clay of a greasy nature, from which a good kind of brick is made, and which, from the character given to it, often causes land slides on the river banks, its depth being from 10 inches to 3 ft.; 3rd, a toughish blue clay, from 10 ft. to 30 ft. in depth; 4th, a coarse gravel, suitable for concrete, and sometimes containing boulders of some size, some 16 ft. deep; 5th, a waterbearing quicksand, usually at a depth of about 48 ft. from the surface.

This description applies particularly to the land in and around Winnipeg. In other parts of the country much firmer strata, *i. e.*, coarse gravel or hard clay, are met with at or near the surface.

It can be readily seen that strata, such as named, present a problem hard of solution to the builder; for, even after sinking through the loam and yellow clay to the blue, a "pocket" of the yellow enemy may lurk still at a short distance underneath; and when pressure comes upon it, especially if beneath a corner, may slide away, and cause ugly cracks in the building. In fact, an instance just comes to mind where this has taken place in the costly and carefully founded residence which a city merchant has lately built close to the Main street. This experience, which is rather common, makes it wise to test a foundation by boring, after sinking to the needed depth, and if one of these mischievous "pockets" is found, to use piles where it occurs.

Another injury caused by this fatal enemy is the land slide on the river banks (as stated before), thus making it very difficult to erect permanent warehouses, etc., near the water's edge. In fact, the only support for such to be relied on is, of course, the pile, which has also been generally used here in the early history of the city in the erection of heavy buildings anywhere.

As to piles, the favorite support here for a number of years, it may be said that they are no doubt very reliable, when long enough and driven according to a *proper specification*. This is now known to be very necessary; as the men in charge of the work having been hitherto required to drive piles merely of a certain length, they have often driven a pile through a yielding clay no further than its neighbor, which happened to pass through a tougher medium alongside. This latter should not occur with timber of sufficient length, and required to sink but a certain depth on the last strokes of the hammer. An objection, also, which applies to piles here as elsewhere is, that sometimes the resistance to sinkage is almost wholly owing to friction of the clay on the sides of the pile. Now, the trickling of water down its sides, especially in a wet season, may so far loosen it as to render it unfit to bear its due pressure.

For the reasons given, and on account of their cost as compared with other supports, piles have been very much left out of use of late years, and plank foundations preferred. They are found to do their work well where the boring mentioned above has been used, the plank of sufficient thickness, and laid at least twice transversely, and masonry containing large flat stones built upon to a secure height.

(TO BE CONTINUED.)

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

SINCE last month's report of the building progress of the Ambitious City and its environs, which was certainly meagre enough, consequent upon the conduct of the unions, I have observed that a better state of things will in all probability prevail during the remainder of the season. It is to be fervently hoped that working men will in future "let caution mark the guarded way," and profit by the experience they have learned within the last few months. Gradually the work is coming on, but very gradually. So far the Hamilton Building Inspector's books record the following buildings to be erected for the month of May—that is to say it gives the number of buildings, where to be built, but not the cost of erection, nor the proprietor's name, for which contractors who enter the report should be responsible. I understand the building record is better and more creditably kept in Toronto, and perhaps in future it will be so here:—J. McDonald, 1 2 storey brick dwelling, York street, between Queen and Locomotive street, value, say $1,200; S. S. Ryckman, two 2 storey houses, Heybron street, near Maud, cost $2,000; Chas. Bolton, 2 2 storey houses, Murray and Catharine streets; C. Peebles, two 2 storey houses, Magill street; Mr. Milne, two 2 storey houses, James, near Hunter street; W. James, two 2 storey houses, West Avenue; Mr. Tyson, two 2 storey houses, Florence street, between York and Pearl streets; Mr. Sullivan, brick house on Hunter street, between Cherry and Wellington streets; Mr. James, brick 2 storey house on West Avenue; Adolph Farewell, block of rough cast dwellings on Napier street; W. Richards, 2 storey brick house on Spring street, between James and Heybron streets; Mr. O'Brien, 2 storey brick house 20x28, corner of Victoria Avenue and Evans streets; Mr. Noxon, hotel on King William street; Mr. Howell, 2 brick houses on Queen street south.

In addition to the above some very fine villa residences are being erected on James street South and East Avenue, besides which many more are in contemplation, to be erected on selected lots in the extreme limits east and west, which can now be reached by the street railways. In most of the new residences provision is being made for either hot air or steam heating instead of the ordinary heating by stoves. Nearly all of the stove manufacturers here are perfecting new and improved radiating furnaces for dwelling houses.

MONTREAL.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

The building trade is very brisk this month, and all the larger works are being pushed forward while the fine weather lasts.

A large extension is about to be added to the Windsor Hotel. The management have secured a large vacant lot adjoining, on which the addition will be built; it will consist of a large hall and concert room 140 feet by 60 feet, with galleries at each end.

The Montreal Gas Co. have ordered a new gasometer from Messrs. Laidlaw, of Glasgow, to replace the one recently blown up at Hochelaga.

The residents of Verdun are vigorously opposing the erection of the new Protestant Insane Asylum, being persuaded that serious unsanitary results would ensue to the Verdun municipality as well as to the city of Montreal.

Two new elevators have been placed in the court house by a New York firm.

Chief Patton, of the fire brigade, has been appointed assistant Building Inspector, and will no doubt make a competent one, as he was engaged in the building trade prior to joining the fire department.

OWEN SOUND.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE North American Chemical Mining and Manufacturing Company, of this town, have discovered a large deposit of marl with clay underlying, covering several hundred acres, which they have secured, and are now organized with the intention to turn out on a large scale Portland cement. They have had the material analyzed, and it proves to contain all the ingredients for the production of a high grade Portland cement. The Company have erected "test-kilns" recently, and have succeeded in turning out a cement that cannot be excelled by any of the leading Portland cement makers in Germany or England. The directors of this company are Messrs. H. J. Doyle, Wm. Robinson, John Corbett and R. P. Buchart, of Owen Sound, and Wm. Heard, contractor, of Chatham, Ont.

Architect J. C. Forster reports the following work let this month: Brick residence for Mrs. J. W. Layton, cost $1,895, contractor, Chas. Crothers; additions to Brockholm school, cost $839, contractors, Gordon & Sinclair; pair of semi-detached brick residences for Mr. Jno. Stephens, cost $2,800, contractor, D. L. Binns. Plans are prepared for additions to American Hotel, and J. M. Kilborn's stores; also for a residence, brick, with stone trimmings, for W. S. Wolfe.

Contracts have also been let for Mr. Jos. Robinson's block of stores and music hall, Wiarton, Ont., to R. Washburn and Simon & Hill, contractors, cost about $5,000.

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400 yards of asphalt walk will be laid in Galt this season.

Work has been commenced on the building for the new Methodist book room and publishing establishment on Richmond street, Toronto. The site cost $30,000 and the estimated cost of the building is $70,000.

Messrs. Harris & Walton have been instructed to prepare plans and specifications for the improvement of Albert College, Belleville, towards which Prof. Dyer has raised $2,400 by subscriptions.

Mr. Baker, engineer of the Forth bridge, and Mr. Jas. Ross, of Quebec, after investigation, have pronounced the tunnelling of the Detroit river as being feasible, and a syndicate known as the Michigan and Canada Tunnel Company representing, it is said, more than $100,000,000 of capital, has been formed to carry out the work.

We hope, says the *American Architect*, that some one is keeping notes of all the building accidents in which Portland cement plays a part. As used by inexperienced persons, it is certainly a dangerous material. Our professional brethren abroad have learned to take various precautions against over-liming, underburning and other defects, of which we know little, and as we, presumably, often get the cement shipped to us which the foreign engineers have rejected, it is all the more important to be on our guard.

When a succession of door entrances are in line with each other says the *Builder and Woodworker*, a far better effect is produced by taeir being low arched instead of being cut off above by horizontal lines. Arches springing directly from the jambs have not the meagre look of those resting on pillars; the curve, too, contrasts well with the straight rods of portieres, and may be filled with elegant metal open work protected by glass.

The method of sinking a shaft through sand by freezing the sand and excavating it like rock has recently been carried out in Belgium. Large iron tubes are sunk in the sand about three feet apart, and in these tubes smaller tubes are inserted, through which circulates a solution of chloride of magnesium. The sand is frozen for a distance of three feet around. It resembles rock, is hard and compact, and can be excavated in the same manner as rock. It is probable that the process can also be used to great advantage in the digging of foundations where water and sand often make trouble.

EXAMINATION QUESTIONS FOR PLUMBERS.

IN view of the examinations now being held in this city for applicants for plumbers' licenses, the publication of the following list of questions propounded by the examiners last year will doubtless prove interesting; and although the questions this year are not likely to be the same as appear on this list, the plumber who familarizes himself with the subjects referred to in this question list, will without doubt stand a better chance of passing the present examination:

1. State in general terms the drainage and plumbing requirements of a city dwelling.
2. Give a short description of the principal materials and fixtures used in drainage and plumbing.
3. Describe the different classes of water-closets, slop sinks and scullery sinks in use in this city, and state the advantages and defects of each.
4. Write a concise specification of materials and workmanship required in the plumbing of a house, as shown on the accompanying plans.
5. Give a description of the different makes of traps, stating the advantage and defects of each.
6. Describe the arrangements necessary for the proper disposal of subsoil water, rain water and sewage.
7. Describe the manner in which the following joints should be made: (*a*) connection of soil pipe with street drain; (*b*) of lead with iron pipe; (*c*) of iron pipes with each other, and (*d*) of a water closet with a soil pipe.
8. What purposes do ventilation or anti-siphon pipes serve, and how should they be run?
9. Where should traps in fixtures be placed, and how should connections from overflows be made?
10. What is the benefit of foot ventilation, and where should it be placed?
11. Why should a soil pipe be carried out through the roof, and what circumstances should govern its position and height?
12. How should the main trap of a house drain be set, and what should govern its position?
13. What are safes under fixtures for, and where should water from same be discharged?
14. How should the waste water from a refrigerator be disposed of?
15. How should overflows from supply cisterns be put in, and where should the waste from same be discharged?
16. How would you dispose of a safe waste from urinal?
17. Describe the construction of a grease trap, and under what circumstances should one be used?
18. How should the water pipes in an ordinary house heated by stoves be run to prevent freezing?
19. In what manner should water and waste pipes be run and fixtures set to meet the requirements of first-class work?
20. Describe the different methods of testing soil-pipes, drains, etc.
21. Describe the methods you would follow to discover any sanitary defects in a house. Plumbing and drainage defects are not alone referred to in this connection.
22. What conditions cause the movement of air in ventilation ducts or pipes, and what are the principal retarding influences?

THE ACTION OF WATER UPON LEAD PIPES.

DR W. R. THOMAS, senior physician to the Sheffield Public Hospital, in the course of a clinical lecture on "Lead Poisoning from Drinking Water," reported in the *Lancet* for April 7th, said: "Water generally contains a certain amount of carbonic acid. This acid acts upon the inner surface of the pipe, forming an insoluble internal coat of oxy-carbonate of lead, which effectually prevents the water from further acting upon the pipe. Hence old pipes which have been down for years are far less dangerous than new ones. Water which contains lime salts, as the carbonates and sulphates, also assist in forming an internal insolution coat, as the carbonates and sulphates unite with the lead. New pipes are apt to be acted upon by the oxygen which the water contains; a soluble oxide is formed, which contaminates the water. The nitrites, nitrates and chlorides found in water contaminated by sewage are very injurious, as they dissolve the lead; so also peat and other vegetable matter have a similar deleterious effect. The Sheffield water from a certain sources is acid, and most certainly dissolves the lead. The water in other towns has had a similar effect upon the lead. For some time the inhabitants of Keighley suffered from plumbism, as we do now, from drinking water. Mr. Jarmaine, of Huddersfield, recommended the authorities of Keighley to use limestone, to counteract the acidity of the water. This was placed in conduits, and the water was allowed to pass over it. They have found at Keighley that it has been necessary occasionally to add quicklime to aid the limestone, especially in summer, when the water is scarce. This plan, which has been adopted at Keighley and found to succeed, is now being tried in Sheffield, and I trust it will be equally successful here. It is a matter of vast importance to the town of Sheffield, as the drinking-water containing lead is now giving rise to a great amount of disease and suffering."

DETECTING GAS LEAKAGE.

TO detect a leakage of gas, Dr. Bunte, in the *Canadian Magazine of Science*, suggests the use of paper dipped in palladium chloride solution. Such paper changes its color in the presence of gas coming from leaks imperceptible by the odor, and which produce no effect upon the earth covering the pipes. Dr. Bunte suggests the following method of practically applying the test to street mains: Above the pipes are excavated, at intervals of two or three yards, holes twelve to sixteen inches deep, corresponding to the joints and sleeves. In each opening is placed an iron tube, half an inch in diameter, within which is a glass tube containing a roll of the test paper. The air from about the main enters the iron tube, and the trace of gas which may be present reveals itself by coloring the paper brown or black, according to its quantity. If, after ten or twenty minutes, the paper is still white, it may be certainly concluded that at the point tested there is not the smallest escape of gas. Various authorities who have experimented with Bunte's method certify to its efficacy.

The Deseronto *Tribune* is waging war in a commendable fashion on the piggeries which abound within the thickly populated portion of that town.

A lump of soda laid upon the drain-pipe down which waste water passes will prevent the clogging of the pipe with grease, especially if the pipe is flooded every week with boiling water.

The Suburban Water and Light Co. has been organized to provide an efficient water and light supply to residents on Yonge street, between York mills and the Toronto city limits.

A company has been formed in Toronto to manufacture pure ice. We observe that at a recent meeting of the Local Board of Health the Medical Health Officer recommended the use on sanitary grounds of ice thus manufactured.

We are indebted to the town clerk of Brockville, Ont., for a copy of a by-law to license and regulate plumbers passed March 5th of the present year. The ordinance seems to have been fashioned after the Toronto by-law. We hope to see similar action taken by all the larger towns and cities throughout Canada.

At Buda-Pasth a well has been bored which yields daily 176,000 gallons of water at 159° F. The attempt will be made to bore until the temperature of the water reached shall be 176°, which will be hot enough for heating purposes.

The Belleville Gas Company have signed a contract with the National Gas Light and Fuel Company, of Chicago, looking to the introduction of a process for the manufacture of gas from crude oil, steam and hard coal, with a capacity for 120,000 cubic feet of gas per day.

An experiment is being made in New Albany, Ky., for the purpose of ascertaining the feasibility of operating an electric light machine by the power afforded by the water works system. Should this experiment prove successful, it may be expected to result in cheapening the cost of electric lighting.

Two smoke testing machines have just been imported from Scotland by a firm of Toronto architects and one of our leading city plumbers. We believe these are the only machines of the kind in this city. The machine consists of a smoke reservoir, from which the smoke is propelled by means of a bellows through a rubber tube into the plumbing system, and any leaks in the pipes are quickly discovered.

A contemporary states that the presence of sewer-gas in a room may be detected by the following method: Unglazed paper is saturated with a solution of acetate of lead in rain water, one ounce of lead salt being dissolved in eight ounces of the liquid. Allow the paper to partially dry and then expose it in the room which is suspected of entertaining the deleterious gas. Any considerable quantity of the gas turns the paper black

BRICKS OF BLOWN GLASS.

WE have already mentioned, say a writer in *La Construction Moderne*, the many applications of glass for building purposes, as exhibited at the last exhibition of decorative arts. Thanks to the decrease in price of coal, and to the recent improvements in glass manufacture, the product is classed at the present time among the usual material the architect employs. It is well known that the process of glass making is by melting or blowing. Sheets of polished glass from 14 to 30 millimeters in thickness are chiefly used for casings of walls in dining rooms, linings of bath-rooms, water-closets or recesses requiring frequent cleaning. They answer the same purpose as pottery tiles or enamelled bricks. Rough glass of greater thickness is employed as flagging for pavements for the purpose of forming a luminous flooring. It is then set by means of putty for cement in iron settings. Blown, in place of melted, glass can be advantageously used when lightness and transparency is preferred to strength, when, for instance, it is desired to use glass in vertical walls or ceilings with the object of lighting lower stories or basements. As applications of the kind have been rare, we are pleased when we have the opportunity of recording them. One of the latest instances of the employment of glass in this manner has been made by M. Falconnier, architect of Nyon, Switzerland, who has used glass in the form of hollow bricks. These bricks are cubes of 10 or 15 centimetres on the side, set in grooved iron casings. The joints in cement or plaster are retained in a grooving hollow around the circumference of each piece, and held by putty. The metallic lattice work, very useful in a wall where strength is required, may be discarded where the object is strictly decorative. One of the principal qualities of these hollow brick is the isolation by the enclosed air which can be replaced by other matter less conductive of heat and sound. Besides, with the hollow glass various decorative effects can be obtained without the necessity of resorting to grinding or enamelling, as it is very easy to coat the inner faces with oil colors. M. Falconnier has also applied these hollow bricks at Lausanne, in attic decorations, and in the construction of balusters and verandas.

HOW TO MEASURE A ROOM FOR WALL PAPER.

IT often happens that a person living at a distance from a city is thrown upon his own resources to determine the amount of wall paper requisite to paper a room. The following rule, says the *Painters' Magazine*, will meet the case, which, however, is only approximately correct, but sufficiently accurate for all practical purposes. It is better to order a little in excess than otherwise, as the extra portion may be used to replace damp or defaced portions or for other purposes.

To determine the number of rolls of wall paper to cover the walls of a room, measure the circumference, from which deduct the widths of doors and windows, and windows, and divide the remainder by three.

Example.—Let us suppose a room 12 ft. x 16 ft., which has two doors and two windows, which average 14 ft. wide

12 + 12 16 + 16 – 56 circumference.
4 × 4 – 16 doors and windows.
56
16
340
13⅓ or say 14 rolls.

This rule is calculated for room of not less than 10 or more than 12 feet in height.

For a room under 10 feet high, having a frieze say of 6 inches required, proceed as before with the measurement of the room, deducting the width of doors and windows. But in this case multiply the remainer by 2 and divide by 15, for this reason, that we can cut 5 lengths out of a double roll, which placed side by side on the wall, covers a space 7 ft. 6 in. from floor to ceiling, and instead of multiplying by 7 ft. 6, we multiply both by 2.

Example.—Take a room 14 x 14, with 2 doors and windows.

PERVERTING FACTS.

WERE the following assertions of Mr. J. R. Hovenden in his address on painting, recently delivered before the Architectural Draughtsmen's Association of Toronto, Canada, to be accepted, the painters and decorators of the Dominion would be certainly entitled to our commiseration. The lecturer, as reported by the CANADIAN ARCHITECT AND BUILDER of that city, observed :

"I have avoided recommending the use of boiled linseed oil in mixing color or brown japan as a dryer, from the fact that nineteen out of every twenty barrels of boiled oil is what is known in the trade as 'bung hole' boiled oil, viz., so many gallons of raw oil is taken out of a barrel and a corresponding number of gallons of a cheap liquid dryer is put back in its stead ; the barrel is then bunged up and rolled around, and you have your boiled oil complete. The average brown japans are very little better as to quality, being made from a very small quantity of cheap varnish gum and a very large quantity of resin (or North Carolina gum), with a little shellac. The use therefore of either or both in painting wood work inside or outside is somewhat dangerous, and when used the work is certain to crack, honeycomb and blister. Of such work there are thousands of specimens to be met with in this city to-day.

Assertion is not proof. The assumed positiveness in giving the actual proportion of sophisticated barrels to the entire bulk supplied excites incredulity in the speaker's honesty and sincerity. It is always easy to denounce and to exaggerate. Had the speaker contented himself with mentioning the fact of adulteration, his statement would no doubt go unchallenged ; in the architectural draughtsmen he appears to have thought he had a lot of gullible listeners. Those painters in Canada who want pure linseed oils and good japans can doubtless get those articles if ready to pay the price and possessing sense enough to buy from reputable houses. The allegation appears to have been an attack on painters themselves, who are by no means helpless sheep whose fleece are being torn by ravenous wolves. So of the following :

"A mode of procedure to be avoided is that of priming wood work with a color composed of all the odds and ends of a paint shop. It is usually 'fat,' and will not dry hard no matter what pains are taken to make it do so, and the result is, in all cases where used, cracks, blisters, &c."

No one of course compels a painter to make up such a priming. We advise Mr. Hovenden, whose remarks to the draughtsmen show him to possess some knowledge of painting, indeed to be a house painter himself, to keep within the limits of his own knowledge in his future public assertions. After all it is well to learn of embyro architects getting a lecture on how to prime and lay on coats of paint. Were our own architects so far instructed in the art of painting as better to appreciate good work, the lot of the qualified house painter and decorator would certainly be happier.—*Painters' Magazine and Coach Painter*, New York.

It is recommended that muriatic acid and arsenic, in the proportion of one ounce of acid to two ounces of arsenic, that is arsenious acid, be employed to blacken brass in order to insure the finest result. Lacquers of all kinds are prepared by dissolving shellac in alcohol or wood spirit, as good a method for beginning being found to be that of continually adding shellac to a sufficient quantity of alcohol until the varnish is as thick as will probably be needed, the fact being that as a rule the lacquer is made too thick, about one ounce of shellac to ten or twelve of alcohol usually answering the purpose. To this shellac-varnish is added various coloring matter soluble in alcohol to impart to the lacquer a golden color ; these colors were formerly obtained with dragon's blood, aloes and gamboge, a substitute for these, however, being now the aniline colors which afford all shades of yellow and red that are desired, and which with the plain shellac varnish, furnish all the gold, red gold and coppery hues that can possibly be required. All work to be lacquered should, of course, be warmed, and the lacquer be applied with a soft camel's hair brush.

CEMENT FROM IRON SLAG.

THE subject of the manufacture of cement from iron slag has become an important matter. Not long ago ground slag was added to Portland cement, but was virtually a mere adulteration, injuring the quality of the cement, and useful merely as a means of defrauding customers, under color of a theoretical similarity in chemical composition between the cement and slag, which might be quoted with good effect by a plausible salesman ; and a few years ago a convention of German cement manufacturers denounced the addition of slag as dishonest and useless. Now, however, by persevering effort, the art of making good cement from slag has been greatly developed, and it seems quite probable that the next decade will see the completion of two great industrial achievements, the production of a cheap and excellent cement from materials almost everywhere available, and the profitable utilization of one of the most cumbersome waste-products known to the arts. The extent of the resources which the manufacturers of the new cement have to draw upon may be judged from the fact that, in addition to the mountains of iron slag which already cover the smelting districts of Great Britain, the English furnaces now in blast furnish nine million tons of fresh slag every year, while those of the United States are not far behind their British rivals, and the French and German furnaces turn out nearly as much more. As a barrel of cement weighs on an average about four hundred pounds, the annual British product of slag alone, if it could all be utilized, would afford forty-five million barrels of cement—enough, if made into concrete, to build a dike fifty feet wide, and a hundred feet high, across the English channel.

Within certain limits, the chemical composition of iron slag is nearly the same as that of cement, both being composed of lime and clay, with a little magnesia and alkali. An important difference, however, consists in the relative proportions of lime and clay, the foreign Portland, like our Rosendale cements, containing about two-thirds lime to one-third clay, while the iron slag varies from equal parts of clay and lime, in that from hematite ore, to one-third lime to nearly two-thirds clay, in the Cleveland ores, As it is well understood that cement, either natural or artificial, cootaining more than one part clay to two parts lime is inert, and iocapable of setting, either in water or in air, the solution of the problem of makiog slags into good cement must obviously lie in the directioo of adding lime to it in sufficient quantity to give the proper proportion between the two principal ingredients. The history of the manufacture of Portland cement has already shown that in order to do this efficieotly an extremely thorough grinding and mixing is oecessary ; and the successful modern processes for the manufacture of slag cement secure this in various ways. The process oow in most extensive operatioo appears to be that invented by Messrs. Bosse & Walters, of Brunswick, in which the slag, hot from the furnace, is ruo directly into cold water. This has the effect of granulatiog it ; and after cooling, and drying thoroughly, the mass is coorsely grouod and sifted. Meanwhile one part of lime to every three parts of slag has been slaked, by immersioo in water, dried, and separated by a fan from the heavy and unburnt articles which may have been contained in it. The roper quantities of sifted slag and lime powder are then introduced ioto a corrugated cylinder, together with a oumber of small cannon-balls, an inch or more in diameter. Aiter turniog slowly for two hours, the cylinder is found to be filled with a very intimate admixture of the slag and lime, in powder so fioe that it will pass through a sieve containing forty thousand meshes to the square inch. This is the slag cement, ready for use. In rapidity of setting, the new cement resembles our Rosendales more than our Portlaods, the time to the first induration varying from two to eight hours, while Portland cement often sets in half an hour. In use, the slag cement resists the action of water better than Portland, and it is certaoly free from disposiiion to swell in setting. In tensile strength the Portland cement is superior for the first month or so after setting, but the slag cemeot then begins to gain; and a few months later the strength of the slag cement, either pure or mixed with sand, is in some cases nearly double that of Portland cemeot. Io other respects, the two sorts of cement closely resemble each other, so that the slag compound seems quite as desirable for use as the rather uocertain Portland, while the price is much less, mortar made with three parts sand costing now only two-thirds as much with slag cement as with Portland, while the manufacturers assert that with a little more experience the slag cement can be made and sold at a profit for ten shillings a ton, or less than fifty cents a barrel. This is little more than one-half the price of our native Rosendale cements ; and if the iron furnaces of Pennsylvania, Ohio, Tennessee and Alabama could produce a first-class article, at anything like the same price, they ought to find the profits of their business materially increased, while the people of the country would be benefitted by having one of the best and most useful of building materials put within reach of the slenderest purse.—*American Architect.*

TERRA COTTA LUMBER.

A REPRESENTATIVE of the CANADIAN ARCHITECT AND BUILDER recently had an interesting vis't at the works of the Canadian Agency of the Chicago Terra Cotta Lumber Co., situated in Montreal, and managed by Mr. W. C. Evans. From the latter gentleman it was learned that terra cotta lumber is composed of gritless kaolinic clays and sawdust in such portions as to afford a degree of porosity to the burned product sufficient to allow of its easy working with tools commonly used in carpentry. Its experimental manufacture, and its application as "fire proofing" was introduced in 1882, and has ever since found increasing favor at the hands of architects and builders. Other inventions of later origin are "Brickwood" a composition of clays, or clayey loams, and sawdust so intimately mixed and worked into form by heavy steam or hydraulic power as to render its burned product one-third the weight of common building bricks ; "Cellular pottery," a mixture of surface clays, with fibrous vegetable matter, as straw, or its equivalent, in such proportions as to enable the safe drying and burning of hollow blocks pressed into the shape of joists and timber in lengths as great as ten or twelve feet ; "Holstein," or woodstone, so called because composed of clay and sawdust, with sufficient straw added to furnish the required amount of fiber in their green pressed state to overcome the tendency of the wares to crack, while drying, will safely yield large hollow blocks, for the outside walls of houses, in the place and imitation of stone weighing as much as two or three hundred pounds.

All of these wares are incombustible and offer as much resistance to the action of fire as bricks, for the final process of their bring is indentical. Unlike brick, however, their great porosity confers remarkable non-ductional properties of heat, cold, and sound. It is claimed that their production can be had of any sort of clay or loams ; that their first cost is cheaper than "slopped" bricks ; that wooden framed buildings, at no enhanced cost, may be so sheathed and protected by their appliction as to be as secure against incipient fires, as the usual fire-proofed structure of iron ; and that such construction affords the comfort of houses of brick in northern countries and of wooden in hot climates.

COMPOSITION OF ANCIENT MORTAR.

MR. JOHN, HUGHES, F. C. S., in the London *Builder*, after an analysis of some pieces of ancient mortar draws the following general conclusions therefrom :

1. That in ancient mortar a much larger proportion of lime was always used than at present is the practice.

2. That a superior quality of lime was employed, and that the proximity of good limestone for burning purposes was as important as the presence of good stone for building purposes.

3. That sand of an angular character, with sharp edges, is much more effective than sea or river sand, which possesses a rounded surface, and is, therefore less binding.

4. That if more attention were paid to the quality and composition of mortar and its freedom from rubbish, such as earth of a clayey nature, new buildings would be more durable and require repairs less often.

A Saratoga Springs, N. Y., inventor has devised a radiator with a swivel joint at one end, to which the steam and return pipes are connected, and around which the radiator can be swung, if desired to change its position or to clean under it.

We are pleased to learn that the Barnum Wire and Iron Co., Windsor, Ont., has been awarded the contract by the Dominion Government for all the interior iron work for the new Departmeotal buildings at prevent in course of construction at Ottawa.

Messrs. Clare Bros., Preston, Ont., manufacturers of heating furnaces, are adding to their works a three storey stone addition 195x67 feet. Mr. John Wirschiog has the contract for the masoo work, and Mr. L. Eyers for the carpeoter work, Mr. George Winterhalt supplying the lumber.

On Juoe 5th the J. F. Pease Furnace Co.'s factory on Queen street, in this city, took fire from a box factory in the rear. Before it could be extinguished $10,000 worth of stock had been destroyed. The building was also damaged to the extent of $2,000. The entire loss is covered by insurance.

The Napanee Cement Co. have recently removed from Napanee and have taken possession of the new buildings erected for them at Napanee Mills on the Napanee railway, five miles from the town of Napanee. It is the intention of the manager, Mr. Bravender, to put in operation shortly a second pair of stones.

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BRETON, ONT.—A new Presbyterian church is talked of.

STELLA, ONT.—A new English church is in contemplation.

PICKERING, ONT.—Tenders are asked for a new school house.

WESTMEATH, ONT.—A new Methodist church is to be erected here.

ARNPRIOR, ONT.—A handsome new town hall is to be erected here.

BRANDON, MAN.—A movement is on foot to establish an hospital.

CAMPBELLVILLE, ONT.—A new Presbyterian church is being talked of.

RAT PORTAGE, ONT.—A system of waterworks is being discussed here.

STRATHROY, ONT.—The Baptists intend erecting a new church this summer.

SUDBURY, ONT.—A new Presbyterian church will shortly be erected here.

OTTAWA, ONT.—A new $70,000 church for Irish Catholics is to be built here.

MITCHELL, ONT.—Mr. Walter Thompson will erect a large grain elevator.

LONDON SOUTH, ONT.—Plans are being prepared for a new Baptist church.

BRAMPTON, ONT.—The citizens have voted $9,000 for waterworks extension.

WOODSTOCK, ONT.—Plans of an opera house to cost $40,000 have been prepared.

STREETSVILLE, ONT.—The Presbyterians of this place intend enlarging their church.

HAMILTON, ONT.—The Y. M. C. A. have purchased a $7,400 site on which to erect their hall.

GALT, ONT.—The by-law grabting $8,000 toward the erection of an hospital, has been carried.

DORCHESTER, ONT.—The Methodist congregatioo of this place have decided to erect a new church.

LISTOWELL, ONT.—The Baptist congregation are taking steps towards the erection of a new church.

VANCOUVER, B. C.—Parliament has voted $10,000 for a new post office and custom house building.

WALKERTOWN, ONT.—The Town Council has granted the Board of Education $4,000 for a new school.

FEMBROKE, ONT.—Mr. Willis Chapman, C. D., is preparing a report upon a proposed system of waterworks.

WELLAND, ONT.—The Waterworks Committee ask tenders for 500 feet of flexible joint pipes 8 inches diameter.

WINDSOR, ONT.—A by-law appropriating $22,000 for the erection of a Collegiate Institute building has been passed.

AMHERSTBURG, ONT.—The Essex County Council is considering the question of erecting an Industrial Home near this town.

STRATFORD, ONT.—A syndicate is being formed with a view to the erection of a first class hotel.—It is proyosed to erect an opera house.

GUELPH, ONT.—The citizens are considering a proposal to erect a new building for the fire brigade and extend the water mains.

CALGARY, N. W. T.—The Council will ask tenders for the construction of a system of waterworks. Address the Mayor for particulars.

ORILLIA, ONT.—The Presbyterians of this town have decided to erect a new church modelled after the one at Parkdale, at a cost of $16,000.

KEEWATIN, ONT.—A new Presbyterian church is to be erected to cost $3,000.—Funds are being raised for the erection of a new Presbyterian church.

SARNIA, ONT.—A school house to cost $3,500 is to be built for St. George's church.—Proposed alterations to the High School building are being considered.

SAULT STE MARIE.—It is expected that tenders will soon be invited for work on the Sault canal, for which one million dollars was appropriated last session.

DESORONTO, ONT.—Ald. Hanley, of Belleville, Ont., has prepared plans for a new high school at this place, to cost about $2,000.—The impossibility of getting pure water has led to consideration of the question of putting in waterworks.

VICTORIA, B. C.—The Dominion Parliament has placed in the supplementary estimates the following sums to be expended on public works in this province : Improvements on Columbia River above Golden, $50,000 ; Penitentiary, including re-bate for warden's residence, $25,000 ; Telegraphic service between Bonilla Point and Victoria, $15,000 ; river channel, Coquitlan, with new dredging plant, $13,000 ; Fraser river additional grant, $10,000 ; Bigg's Portage, channel, $10,000 ; building Indian Industrial School at Kootenay, maintenance of thirty-five pupils, $9,000.

WINNIPEG, MAN.—The following appropriations for public works in the Northwest have been placed in the supplementary estimates :—Battleford Land and Registry Office to complete vault, &c., $2,500 ; residence of the Lieut.-Governor of the Northwest Territories at Regina, $15,000 ; Lieut.-Governor's residence repairs, $2,000 ; Calgary court house, jail, registry office, &c., $10,000 ; crown lands and timber agents' offices at Regina, Prince Albert and Edmonton, $15,000 ; Northwest mounted police buildings, $100,000 ; court house, lock-up and police accommodation at Moosomin, Maple Creek and Medicine Hat, $10,000 ; Fort Macleod, storehouse for use of collector of customs and inspector of cattle ranches, $1,000 ; general repairs and improvements to harbors and rivers in the Northwest Territories, $4,000 ; new stations at Saddle Lake on the Qu'Appelle and Edmonton line, via Fort Pitt, $600 ; telephone line to connect the police headquarters, &c., with the Banff telephone exchange, $6,000.—It is proposed to lay ten miles of new water mains during the present year.

TORONTO, ONT.—It is proposed to make extensive improvements in the interior of St. James' Cathedral, to include removal of galleries, repainting floor, erection of choir stalls and choir vestry. The outlay will amount to about $40,000.—The residence of the late Senator McMaster on Bloor street, is to be converted into a Ladies College for the Baptist denomination.—The following permits for new buildings have been issued during the past month :—Geo. Rudeo, pair s. d. 2 storey and attic bk. dwelling, cor. Bismarck and Gwynne Ave., cost $7,500 ; Prospect Park Skating Co., one storey r. c. skating and curling rink, Prospect st., cost $8,000 ; Methodist Book Room, 2 four storey bk. warehouses, Richmond st., west, cost $50,000 ; Mr. Milligan, pair attached 2 storey r. c. dwellings, Baldwin street, cost $3,000 ; W. Wantz, 2 storey bk. dwelling, D'Arcy street, cost $3,500 ; J. Wardell, pair 3 storey attacked stores, Spadina Ave., cost $2,500 ; Mr. Stewart, 2 storey and attic bk. dwelling, Wilcox street, cost $5,000 ; R. Black, 2 storey and attic bk. dwelling, Richmond street east, cost $2,000 ; W. Christie, pair attached 2 storey and attic bk. dwellings, Classic Ave., cost $5,000 ; J. C. Clark, 2 storey and attic bk. dwelling, Avenue Road, cost $4,500 ; Water Works Dept., bk. addition City Hall, cost $3,000, and 2 storey bk. press house, Soho street, cost $13,000 ; Thos. Ryde, 3 attached 2 storey and mansard bk. stores, 280 Queen street west, cost $6,500 ; W. Layton, 1 storey and mansard add. to Caer Howell hotel, Queen's Ave., cost $1,500 ; Sisterhood St. John the Divine, 2 storey and attic bk. hospital, Major street, cost $21,000 ; R. H. Rethune, 2 storey bk. add. to dwelling, College Ave., cost $7,000 ; R. Jaffray, 1 storey and mansard bk. stable, 78 Grenville street, cost $2,000 ; Chas. Taylor, 2 storey and attic bk. dwelling, Sussex Ave., cost $3,500 ; W. H. C. Kerr, add. to Canadian Pacific Hotel, King and John st, cost $4,300 ; A. J. Henderson, pair 2 storey and mansard bk. dwellings, 77 St. Patrick street, cost $5,000 ; Mrs. Slatter, pair 3 storey and attic r. c. stores, McCaul street, cost $3,000 ; Pelfer Mfg. Co., 1 storey bk. add. to factory, Jahoson St., cost $2,500 ; Jno. Treloar, pair s. d. 2 storey r. c. dwellings, 130 Parliament street, cost $2,500 ; G. Curry, pair s. d. 2 storey and attic bk. dwellings, North street, cost $8,600 ; H. J. Gray, pair s. d. 2 storey and attic bk. dwellings, 166 Rose Ave., cost $6,500 ; John Smiley, pair s. d. 2 storey r. c. dwellings, Price street, cost $1,750 ; Jas. Progley, pair attached 3 storey bk. stores, Yonge street, near Marlborough Ave., cost $5,000 ; J. Wilson, 3 s. d. 2 storey and attic bk. dwellings, Wilson Ave., near Bond street, cost $10,000 ; Chas. Werner, 2 storey and attic r. c. dwelling, Louisa street, cost $1,500.—The A. O. U. W. have decided to erect a new lodge building on Brunswick Ave., and the Sons of England will probably put up a new building on Bathurst street.—The Public School Board has decided to spend $10,000 on repairs to school buildings.

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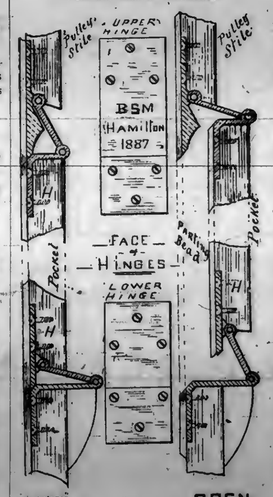

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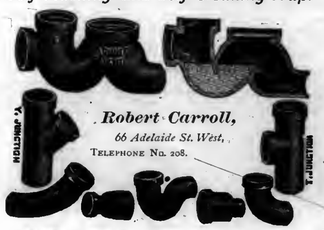

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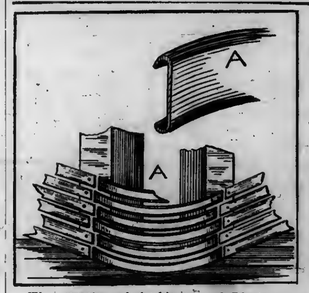

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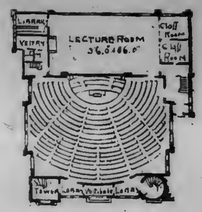

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VOL. I.—No. VII. TORONTO, CANADA, JULY, 1888. PRICE 20 CENTS $2.00 PER YEAR.

THE
Canadian Architect and Builder
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PUBLISHED MONTHLY IN THE INTEREST OF
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EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

WE are surprised to learn that an Ottawa firm, Messrs. A. K. Miles & Son, has been given the contract for the pedestal of the statue to be erected in Major Hill Park to the memory of Ottawa volunteers who fell in the Northwest. It is a wonder that this contract, like that for the statue itself, was not awarded to a foreigner.

THE majority, probably, of the large buildings in Canadian cities are without elevators, and a few visits to offices situated on second or third floors is sufficient to make one feel fatigued during the balance of the day. Not only are the elevators too few and far between, but where they are to be found they are adjusted to move at a snail's pace. Elevators of smaller size and greater speed would fulfil public requirements much more satisfactorily than those at present in use.

THE attention of contractors is directed to the advertisement on another page of the Court House Committee of the Toronto City Council asking tenders for the various works required in connection with the erection of the new Court House and City Hall. We are pleased to see that a definite move has been made in this matter, and trust that the figures contained in the tenders will not aggregate an amount which will preclude the advisability of proceeding with the immediate construction of the buildings.

THE Superior Court Judge has granted an injunction restraining the County Judge from proceeding with the enquiry in the case of A. W. Godson, the Toronto contractor. His Lordship decides, and we think the decision a most equitable one, that before the City Council can proceed to order an enquiry into the conduct of an individual, it must prefer against him definite charges of wrong-doing. Before ordering an expensive enquiry to be commenced, the Council should have taken the precaution to ascertain that its proposed action was legal. The citizens should not be called upon so frequently to pay the cost of such mistakes. Enough has been made public since the investigation commenced to render it desirable that the facts relating to the dealings of Lackie and Godson with the corporation and with each other, should be laid bare. There is a suspicion in some quarters that the interests of the city are sacrificed by some of its well-paid servants in behalf of contractors. If such be the case, the evil cannot too soon be exposed and remedied. Let the Council go about the work in a legal manner, however, and not waste public money in blundering.

AS stated by one of our correspondents last month, a company has been formed at Owen Sound for the manufacture of Portland cement, the necessary materials it is said having been found to exist in that locality, and successful experiments having been made. Assuming that we are correctly informed, this is an important discovery, and the company that has been formed to take advantage of it, will doubtless find the enterprise highly remunerative. Many thousands of barrels of Portland cement are consumed in Canada each year, the profits on the sale of which go into the pockets of foreign manufacturers. Should the discovery at Owen Sound fulfil the expectations of those engaged in conducting it, this money will be kept in the country, and a new and important Canadian industry will be developed.

THE report reaches us from London, Ont., that the stained glass windows for the sanctuary and transept of St. Peter's Cathedral have been purchased by Bishop Walsh in England. THE CANADIAN ARCHITECT AND BUILDER wishes to enter an emphatic protest against the unpatriotic conduct of those who purchase in foreign markets articles that are produced in equal quality in Canada. We believe we are within the mark when we say that there are manufacturers of stained glass in Canada who are producing an article as perfect in every way as can be bought in Europe. Then, why purchase in Europe? Why did not Bishop Walsh go to Europe for the money to build St. Peter's Cathedral? As long as Canadians are asked to contribute the money for the erection of such structures, the labor and material used in their construction should be Canadian, provided the quality of the native article is equal to that of the imported.

THE selfishness of human nature has been well illustrated by the conduct of the people of this city who have continued to make extravagant use of the city water during the summer months for several years past in the face of the fact that they were knowingly assisting to reduce the water supply to a degree which threatened to result in famine and alarming danger from fire to their own property and that of their neighbors. The City Council has wisely passed a by-law limiting the use of lawn sprinklers to certain hours of the day and evening. In the past these lawn sprinklers have in hundreds of instances been allowed to operate night and day. The next move on the part of the civic authorities should be to increase the city water supply, which is evidently insufficient for the requirements of this populous and rapidly growing city. The proposition to establish a second pumping station and reservoir in the west end of the city is one which we hope to see carried out.

WE are informed that last year Canada imported more than a quarter of a million dollars worth of wall paper. About four-fifths of our total importations in this line came from the United States. This large importation would seem to show that there is considerable room for expansion and improvement on the part of Canadian wall paper manufacturers, of whom there are three, two in Montreal and one in Toronto. To a representative of the CANADIAN ARCHITECT AND BUILDER, one of the Montreal manufacturers recently stated that owing to American competition, the profits of the Canadian manufacturer were barely sufficient to enable him to keep his factory in operation. Seeing that American manufacturers are compelled to pay a duty which is equal to a fair profit before they can place their goods on the Canadian market, we fail to see why our home manufacturers should not hold their own and even supplant the bulk of the imported hangings by native goods. We don't like to hear men complain that they can't hold their own when the advantage seems on their side. We hope that the capital, intelligence and energy necessary to secure the Canadian market for the Canadian manufacturer will be forthcoming.

PUBLIC opinion has been awakened to a satisfactory degree of late concerning the value of sanitary measures for the prevention of the spread of infectious disease. The provincial and local Boards of Health have done a good work in this direction. No better evidence is wanted of the change which has taken place in public opinion on the subject of sanitation, than the fact reported in the daily papers recently, that a physician in one of our cities had been fined by the police magistrate for neglecting to notify the Medical Health Officer of a case of diphtheria. It is well that the offender in this instance, being a physician and knowing full well the danger, but neglecting to give the warning, should be made an example of, so that no attempt will in future be made, either for the sake of convenience or other reasons, to conceal the existence in a community of infectious disease.

WE have just read the list of duties which the Building Inspector for the Toronto School Board will be expected to perform. They are not few nor easy. In fact they are so many and difficult that no one man will be able to perform them. The School Board should have advertised for an architect instead of a building inspector. All plans and specifications for all new buildings are to be prepared by the newly appointed "Superintendent." While the buildings which have been built have not by any means been what they should be, we may reasonably expect that those constructed in the future will be even more inferior. When men who are supposed to have had some little training as architects have done so badly, it is not to be expected that a man who has had none, or practically none, will be able to do as well. We are utterly unable to understand how it is that nearly all public offices are filled by men without any qualification for their duties. That the appointee to this office might have made a fairly good superintendent is possible; that he will make a good architect is extremely improbable. The main thing to be regretted is that a wrong commencement has been made. If there is to be an architect's office with its staff, as there must be if one half of the work laid down is to be performed, it should be efficient, which can never be under its present head.

WE should very much like to see a larger number of architectural drawings at the Royal Canadian Acader · Art Exhibition. That there are not more does not reflect very much credit on Canadian Architects. However, we are inclined to think that there would be more drawings sent in by architects if they

were assured that they would receive decent treatment. In the past, and also at the last exhibition, the architectural drawings have always been put in some out of the way place where no one could see them to advantage. There are some architects capable of making exceedingly good drawings of buildings erected according to their designs. These drawings, while in many respects not as attractive to the public as paintings, are far superior to many of the works hung in prominent positions. When an architect sees a very good drawing of a building placed in a dark and out of the way corner, and at the same time a very indifferent water color placed in a good position, simply because it is a water color, he is inclined to pity the author of the drawing and mentally resolve never to send a drawing of his to be treated in like manner. The architectural drawings at the last exhibition were few, and not representative of the best work of Canadian architects. While it might be said that there were one or two good drawings, it could equally be said that there were one or two which were very indifferent. We hope that the Architectural Guild of Toronto will make an effort to have an exhibition of architectural drawings during the coming winter.

THE foul language used by some workmen whose duties call them inside the dwellings of their employers' customers, has long been a source of very great annoyance. We are pleased to see attention called to the subject by an American contemporary, the *Plumbers' Trade Journal*, which shows how the employer of such men is likely to lose much trade on account of their offensive conduct. "For instance," say our centemporary, "a well known plumber on one of the principal thoroughfares and most respectable neighborhoods in the city has a job of overhauling to do; he sends a journeyman and helper to do the work. The journeyman is not at all backward in using the most profane language at every trivial thing, and in fact has become so addicted to the habit that he swears without knowing it. The lady of the house overhears the journeyman unconsciously swearing, and says to herself, 'Well, so that is the style of workman that Mr. Blank sends to do my work.' She pays her plumbing bill as usual and Mr. Blank wonders why he gets no more of her work." The above hint is one which employees as well as employers will do well to carry in mind. The swearing habit is a most offensive one to most people. Any workman who has contracted it should seek to get rid of it as speedily as possible. Employers should endeavor to find out what is the conduct of their workmen in this respect. If they find them to be addicted to profanity, or foul language of any kind, they should be warned to discard the habit, and should they not do so, the employer will be consulting his own interests by dismissing them from his service.

IT is very gratifying to learn that the Minister of Education for Ontario has been impressed with the value of technical instruction by his recent visit to the technological schools of the United States, and that he has decided to commence work along toat line in Ontario. It is his intention we understand to establish at once a Department of Mechanical Engineering in connection with the School ot Practical Science in this city. In an interview published in a daily paper the Minister is reported to have said: "A lecturer will immediately be appointed whose duties shall be to give instruction on the theory of all matters relating to mechanical skill and designs, and to afford the students that practical knowledge obtained from dealing with the subjects in the workshops themselves. At present it is not the intention to establish workshops in connection with the school, but the students will have the *entree* to the leading public works of the city, where they will have an opportunity of observing how crude material is shaped into its various useful designs, and take part in the work if they are so disposed." We are pleased to learn that instruction in architecture is also to form part of the curriculum of the School of Practical Science at an early day. The architectural course will be similar to that at Cornell University, which covers four years and embraces the ancient and modern history of architecture, practical instruction in designing, acoustics, lighting, heat and ventilating. We are pleased to see that the Minister recognizes that the time has fully arrived when technical instruction should form a part ot our public educational system. The young men of the United States owe much to such institutions as Cornell, and we congratulate young Canadians upon the fact that they are to be given the opportunity to acquire in their own country special knowledge which in the past could only be obtained by a visit to foreign schools.

WHEN we remember how much of England's industrial greatness is due to the systematic instruction imparted to her people through schools of art and design, we find cause for congratulation in the fact that the Department of Education for Ontario has undertaken to encourage and develop Canadian talent in this direction. In this number of the CANADIAN ARCHITECT AND BUILDER we have the pleasure of presenting to the public some samples of industrial drawing and design exhibited at the recent Art School examinations held at the Education Department in this city. Since 1876 the Government of Ontario has given grants of money for art instructure, but only since 1886 has it assumed full control of this important branch of education, under the new act and regulations submitted to the legislation this year by the Hon. Mr. Ross, Minister of Education. Art schools under the inspection of the Department are now in operation in Brockville, Hamilton, Kingston, London, Ottawa, Toronto, and the following institutions are in affiliation with the Department for examination purposes: Wykeham Hall, Toronto; Alma College, St. Thomas; Ontario Ladies College, Whitby; Albert College, Belleville; Hellmuth Ladies' College, London; Academy of Painting and Drawing, London.

In addition to the above, many of the Mechanics' Institutes throughout the Province are giving courses of instruction in mechanical drawing and industrial design, and are sending pupils up for certificates to the regular Art School examinations. We understand that an Art School can be established in any town or village in the province, and each Art School is entitled to receive from the Government a grant of $400 per annum, whenever fifty persons shall have expressed their desire and willingness to take the course of instruction prescribed by the Department for Art School pupils. We do not know whether or not this fact is as generally known as it should be. If the value of such a course of instruction were generally understood we imagine that few, if any, towns or villages would find it impossible to secure the necessary number of pupils. Persons undertaking to impart this course of instruction must furnish the Department of Education with satisfactory evidence that they possess the necessary qualifications. The holder of an art certificate is legally qualified to teach the subjects named therein in any Art School, High School, Model School or Mechanics Institute. As there are already a large number of persons throughout the province holding certificates, it ought not to be difficult for any Mechanics' Institute desiring to establish an art class, to obtain the services of a duly qualified teacher. In the front rank at the recent Art School examinations was the work of pupils of the Mechanics' Institute at Penetanguishene, Ont., a village of small population, and this fact should encourage many more of these institutions to avail themselves of their privileges in the same direction.

A comparison of the many creditable drawings displayed at the recent Art School Exhibition with the poorly executed and meagre list sent in to the Department some years ago, when a selection was to be made for the Centennial Exhibition, strikingly illustrates the gratifying improvement which has taken place and is going on in this direction. A list of the industries in Canada, in which a knowledge of the various branches of art education is necessary, together with the number of hands employed in those industries, shows that not less than 150,000 persons are employed in the Dominion to whom a knowledge of industrial drawing, modelling, etc., would be valuable. This alone is sufficient to show the value of the work which has been undertaken and carried on thus far with such gratifiying results. The work of the pupils of the various Art Schools and Mechanics' Institutes recently on exhibition in this city was inspected by thousands of visitors, to many of whom the talent and skill displayed was a pleasing revelation, and will serve no doubt to vastly increase public interest in and appreciation of this important part of our educational system. The names of the examiners at the recent examinations are: R. Dickson Patterson, artist; E. B. Shuttleworth, Vice-President Ontario Society of Artists; Chas. Fuller, of Messrs. Copp, Clark & Co.; D. B. Dick, architect; Arthur Reading, superintendent of drawing, city schools; Dr. S. P. May, Officer of Academy, Paris, chairman.

For a cherry stain mix together, by stirring one quart of spirits of turpentine, one pint of Japan, one pound of Venetian red ground in oil, and two ounces of dry burnt umber. Apply this with a brush and wipe off with a cloth. Then finish off with one coat of shellac and two coats of varnish

CONDITIONS OF THE TORONTO BOARD OF TRADE BUILDING COMPETITION.

ALL designs must be made in conformity with the following instructions:

The land belonging to the Board of Trade is an irregularly shaped lot, bounded on the south by Front street, on the west by Yonge street, and on the north and east by party walls without right to light. The size and form of lot is given on the accompanying plan, and also the width of the streets. The sidewalk on both streets is practically level, the difference, if any, being only a few inches. Both streets are to be considered of equal importance. This property is about the centre of the wholesale business of the city, and the buildings in the neighborhood range from 50 to 80 feet in height. The prevailing winds are from the north west. The soil is heavy clay, and the depth of available drainage is not more than 10 feet below the street line. There is every facility for carrying out the work. The mode of construction must be determined by the competitor, who must bear in mind the amount set apart for the erection of the building. The building may be six stories in height, and may have entrances from both streets. The ground floor is to be designed for offices. Provision is needed for a janitor's family. The Board of Trade requires, as far as possible large hall, about 1925 square feet; reading room, about 875 square feet; clerk's office, about 300 square feet; Council room, about 250 square feet; secretary's private office, about 100 square feet; grain inspector's room, about 300 square feet; telephone room, wash room, water closet. The accommodation for the purpose of the Board may be placed at the top of the building. The rest of the building is to consist of large and small offices ranging in size from 15 feet by 20 feet, to about 15 feet by 10, and 10 feet high, in suites of various sizes, and so arranged that they can be shut off or thrown together to suit tenants. There are to be two elevators placed together running from the basement to the top. The space under the sidewalk is available, and should be utilized to the best advantage. There are no conditions in regard to occupying space under the sidewalk. The building is to be heated by steam, and proper space is to be provided for boilers, etc., etc., besides proper provision for ventilating the halls, passages, etc. All the principal offices at least must be provided with open grates. Ample provision must be made for public and private closets, sinks, lavatories, coat room, and other closets. It is understood that tenants will furnish portable safes for daily use, and the floors and walls will be make strong enough to carry them, but, besides this, many tenants may require storage; rooms for valuable papers, and fire-proof vaults must be provided. These may be grouped in each storey, forming a continuous stack, or otherwise, as may be found most expedient. Suitable accommodation for a restaurant may also be provided.

The following drawings will be furnished by each competitor, and those only will be received and considered, but minor variations of detail and alternative arrangements may be shown on any of the drawings by means of flaps. They must be accompanied by a brief memorandum, copied with a typewriting machine, explaining any points in the design not obvious from the inspection of the drawing: Plans of the different stories and of the basement, two elevations, sections, perspective.

These will be drawn to a uniform scale of one-eighth of an inch to the foot, and finished in line with Indian ink with the drawing pen.

There is to be no brush work except in blacking the windows and the sections of the walls and floors. The lettering and figuring is to be plain and simple, and is to be confined to the names and dimensions of the rooms, written in the middle of each, without explanatory comments, which are to be put by themselves, as has been said, in a separate memorandum. The number of square feet in each room is to be given, as well as its linear dimensions. These drawings are to be made on white drawing paper, trimmed down to a uniform size of 24 inches by thirty-six inches.

If the plans of two stories are identical, one may be omitted; and if two of the stories are symmetrical in plan, half only of either may be shown.

The perspective will be drawn in line only, without shading, and without any accessories, such as sky, trees, figures etc. The point of sight for the perspective is to be taken at a distance of 275 feet from the angle of the lot; on a line drawn from the angle of the lot through the point of sight as given on the plan already furnished.

The perspective is to be set up from an eighth-inch scale plan. The plane of the picture is to touch the corner of the building.

Each drawing, and also the accompanying memorandum, is to be distinguished by a motto or cypher, and no handwriting of any sort is to be put upon either. Any of the competitors may send in a second set of drawings, embodying a different design, if he desires to do so. In this case it must bear a different motto. No competitor is to employ any motto or device which he has ever used on any previous occasion.

A sealed envelope, bearing the same cypher or motto, is to contain the name and address of the writer. The drawings are not to be framed, glazed, or even mounted on card-board, but are to be sent flat in a portfolio, and are to be delivered to Professor Ware, at Columbia College in the City of New York, on or before the 1st October, 1888. He will employ a competent person to throw out from consideration all drawings, or sets of drawings, not made in conformity with these instructions. The remainder he will examine and will select those which he finds best among them, at least two in number, and these he will hand over to the Committe with his comments, and any recommendat ons he may think t well to make.

The Committee in consultation with their professional adviser will assume the entire labor and responsibility of making estimates for the work, on the basis of the designs selected by them; if they desire information upon this point, employing a competent surveyor to that end.

The Committee will appoint one of the selected competitors as architect of the building, if they find that in their judgment and that of their adviser, they are warranted in doing so; and will execute an agreement with him for the customary professional compensation for such services. The Committee also reserve the right, in case their choice falls upon an architect whose experience and professional standing do not, in their judgment, warrant them in putting the practical conduct of the work into his hands, or who, by reason of distance, cannot well undertake it, to associate with him some experienced person, to be nominated by himself, subject to the approval of the Committee, upon whose competency in this respect they can rely, paying to each his share of the customary fees for his share of the work. If, as may happen, they find themselves unable to choose, upon the evidence before them, between two or more of these candidates, they will invite the the competitors among whom their choice then lies, to present under the instructions of the Committee, such further explanations or drawings as the nature of the questions at issue may require. In case of the successful competitor, all payments will be considered as payments on account of his commissions as architect of the building.

All drawings shall be returned to the competitors as soon as the Committee has made its selection, and they will not be shown to the other competitors nor to the public without the consent of their several authors, previously obtained in writing. Nor shall anything shown in any of the rejected designs or otherwise suggested by the unsuccessful competitors, which is original as to this competition, be adopted and made use of in the building, without the consent of its author, and proper remuneration being made him, the amount thereof to be agreed upon between him and the Committee, and in case of disagreement to be referred to the professional adviser of the Committee, whose decision shall be final not only in regard to the amount to be paid, but in regard to the existence of any such claim.

Any information which the Committee, or any member of the Committee, or their professional adviser, may find proper to communicate to any of the competitors in answer to questions or suggestions, will be made in print, and will be simultaneously communicated to all the rest. Such questions or suggestions must be made before the 15th day of July, 1888, and should be addressed to the Secretary of the Board of Trade of the City of Toronto Toronto, Canada.

The final action of the Committee, and the report to them of their professional adviser, will be communicated to all the competitors.

For the convenience of Canadian competitors these drawings may be sent to the care of Secretary of the Board, addressed to Professor Ware; the Secretary will arrange with the United States Customs for their being forwarded to that gentleman.

CALIFORNIA ARCHITECTURE.

IN a private letter to the editor of this journal, Mr. Geo. H. Wolfe, publisher of the *California Architect*, says: "There is not so much difference in construction between this place and your own as you would imagine. Our better class of houses are all diagonally boarded. On this is nailed tar paper and then rustic. Our rustic is somewhat similar to your weather boarding principle. Thermometer in this city never gets below 20° above zero, and only in exceptionable instances does it get as low as that. How our buildings would stand your climate, of course, is a problem. Nine-tenths of our buildings are built entirely of wood, chimneys alone excepted. It is not until lately that brick have come into general use for foundations for frame dwellings."

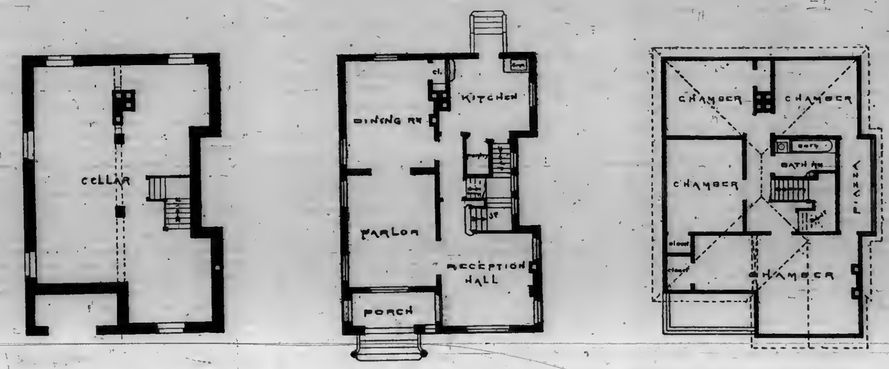
We understand the Secretary of the Toronto Board of Trade has received letters from more than a score of American architects informing him of their intention to enter the competition for the Board of Trade building.

If the University authorities and the Government of Ontario should decide to establish a chair of Architecture in connection with the School of Practical Science, Toronto, we hope to see it filled by a Canadian professor. We have among us architects who have had the training to qualify them to discharge the duties of such a position with honor to themselves and advantage to the students who should look to them for instruction. In the past there has been too much going abroad after men to fill positions of this kind. This country has now reached the stage where native talent may justly claim and should receive proper consideration.

OUR ILLUSTRATIONS.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION —DESIGN BY "WELLINGTON."

WE should judge that it was the intention of the author of this design to face his house south. If such is the case, the plan would be very much improved if it were reversed, so as to place the rooms now on the west side on the east. The east and street exposure is the most valuable, and yet the author has placed the reception hall, staircase and kitchen on this side of his house, and the dining and parlor on the west. The dining-room should always when possible have an east exposure, and should never be placed on the west side. The parlor, although its position is not very important, should always be placed in the best available one. In this case it has been placed on the west side, away from a street, when it could equally well have been placed on the east side, and next the street. The staircase can go anywhere, but should never be placed where it would be much better to have a room. The inhabitants of a house do not live in the halls nor in the stairway, but they do live in the rooms, and consequently the rooms should be placed in the better position. The kitchen would have answered every purpose if placed on the west side, thus giving place to the dining room. Then, again, the dining rooms are placed on the most exposed side of the house, where it is most difficult to keep them warm. How would it be possible to keep the dining rooms warm in cold weather, exposed as it is to the Northwest winds. The reception hall is too large and important for a house of this size and value, and moreover, has too many windows. No vestibule has been provided, which is a most serious objection. This climate is much too severe to have but one door closed against it—two is none too many. A vestibule could easily have been secured by narrowing the opening to porch and placing a door close to the joint of window to parlor. Then the little windows at the side of this arch would have been of some service, if enlarged to be of some use. A house of the pretensions of this one should not be without a pantry. There is a small closet through



"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR $25,00 TOWN HOUSE—DESIGN SUBMITTED BY "WELLINGTON."

which service to the dining room can be had, but that alone is of small benefit. It also means that two servants must be kept if anything is to be gained by this arrangement; and we fancy that any one who is able to keep two servants would not care to live in a house if built according to this design. There is a small inside closet in the kitchen and that is all; the pantry accommodation is therefore exceedingly limited. The kitchen is so badly cut up with doors and windows that it would serve its purpose very indifferently. A kitchen door should always be protected by a porch. On the first floor there are four very good bedrooms, three of which have closets. We do not approve of the recess or whatever it may be called out of the first bedroom. This space could be used to much better advantage by rearranging the plan, and bringing the west center bedroom forward to the first. The bath room is fairly good, and has the proper exposure. The basin seems to have been reduced in size to allow of its being set in the angle of the break in the partitions. If the scale of the w. c. and bath is correct, this basin cannot be more than 6 inches in diameter. The piazza is nicely arranged, and of value.

We are much better pleased with the elevation than with the plan. It is very simple, and, generally speaking, satisfactory. The roof is perfectly simple and the possibility of leaks is reduced to a minimum. The windows to the staircase on both floors are in rather impossible and inconvenient positions. We would advise the author of this plan to study out his plans more carefully. Good elevations will not remedy a bad or inferior plan. He apparently has devoted more thought to his elevations than to his plans, and in so doing has made a very great mistake.

MECHANICS' INSTITUTE BUILDING, MONTREAL, QUE. —JAMES WRIGHT, ARCHITECT.

SPECIMENS OF DRAWING AND DESIGN BY PUPILS OF ONTARIO ART SCHOOLS.

THE NEW PARLIAMENT BUILDINGS.

IF the lithographic print which is for sale in the stationary stores is a fair representation, making all due allowance for the badness of the lithograph, of the new Parliament and Departmental Buildings which are now being erected in the park, the question must be asked, why did the Government take the work out of the hands of Canadian architects and give it to a foreigner? The design of this building is so wretchedly bad in the composition that no possible beauty of detail or profuseness of carving can redeem it, granting that the mind which could design such a weak and inartistic composition will be able to give us good work in individual parts, and in the detail. It is now about two years since this work was commenced, and yet the Government have not thought it wise to inform the public as to the description of the building in the erection of which they will be obliged to spend at least two millions of dollars. If the building is anything like the lithograph, we can easily understand why they have not had authentic cuts of the elevations and perspectives made and distributed for the information of those who have to foot the cost. Nor have they, so far as we are aware, placed the elevations or perspectives where they can be seen by the few. We should be only too glad to publish among our illustrations representations of the building or its parts if we were supplied with the drawings. Now that there is a lithograph published which represents the building as one that will, if erected according the design thus shown, be one of the ugliest and most inartistic buildings erected on this continent, or for that matter, any other continent, during the past ten years, the Government should see that an authoritative cut of the building is published.

It is only a few days ago that we saw the perspective drawing of the design submitted by Messrs. Darling & Curry, and were obliged to admire the beauty of the composition as a whole, as well as of the individual parts. One of the lithographic prints was placed alongside of this drawing, and making all due allowance as between the pictures, one might be said to represent Day, the other Night. That a foreign architect should be appointed to design this most important building in preference to a Canadian, is bad enough, but that a good design by Canadians should be cast aside, and a building erected according to such an inferior one by a foreigner, is worthy of the strongest condemnation. Until Canadians believe in themselves, there will never be any national life worth speaking of, nor will the ablest among our young men remain in their native land. We have had too much talk about a Canadian national spirit, without the action necessary to bring it into vigorous life on the part of our public men and the press. Would it not be much better, for a time at least, to have our belief in Canada and ourselves shown by acts rather than words? The greatest traitors can talk most patriotically, but it is only the man who is patriotic in his deeds who is trustly loyal.

INSTRUCTION IN ARCHITECTURE.

IF the Minister of Education carries out his intention of appointing a lecturer on Architecture in the School of Technology, he will have made a long step forward for the advancement of architecture in this country —not that we are so deficient in architectural ability as some of our would-be architectural critics would have us believe. If this kind of art is placed on the curriculum of the school, every care should be taken to have it most thoroughly taught by experienced lecturers. We would suggest that at the commencement the course should not be too long, but that it should be made to give architectural students a first-class primary training in construction, the science and history of architecture. It is as impossible to make an architect in a college, as it would be to make a competent seaman and navigator by a theoretical course at a school miles from the sea. The profession will gain immensely by having only educated men in its ranks, and if all are not good architects, they will at least have sufficient training to know good from bad work. There are so many untrained men in the ranks of the architects, and the public are so unable to judge good architecture from bad, that the few good men receive but little recognition, and that only from the cultured few. We should think that some arrangement might be made with the architects now practising to receive into their offices students from the School of Architecture in preference to non-attendants. By this means the profession would feel the benefit of the school, and the students would have the advantage of having all openings for students in architects' offices kept for them in preference to others.

TORONTO ARCHITECTURAL GUILD.

THE monthly meeting of the Architectural Guild, of Toronto, was held at Lorne Park on Thursday afternoon. The members were most hospitably entertained by Mr. and Mrs. Burke, to whom they are very much indebted for a pleasant afternoon. Notwithstanding that the day was decidedly one of pleasure and quiet enjoyment, there was a large amount of business transacted. There were also animated discussions on many questions of much moment to the advancement of architecture in this country. Much satisfaction was expressed with the intimation of the Minister of Education that he proposed to appoint a lecturer on architecture in the school of technology.

Architectural competitions, unless conducted upon a different and more equitable plan than heretofore will soon have to be abandoned, for the reason that no architect of any standing will have anything to do with them. A competition has just closed at Minneapolis, and this is what the *Northwestern Architect* says of it:—"There has been nothing in this competition to relieve the system from the contempt into which it has fallen among reputable architects. The merits or demerits of the designs submitted had very little to do with the final decision, the fight was between the two firms that everybody knew were to struggle for it, and was merely a matter of wire-pulling, and the most astute wire pullers won. Yet this is the method by which the architects of most of the public buildings in this country have been selected, and, although we believe the selection in this case to have been a good one, we must admit it to be a bad method. Is it any wonder that a majority of our public buildings are no credit to us, that many begin to fall down before they are fairly up, that charges of jobbery and peculation begin to accumulate as the walls go up, and that in most cases the scandal sticks.

PERSONAL.

Messrs. Knox & Elliott, architects, late of Chicago, have opened an office at 15 Victoria street, Toronto.

Mr. F. Bourchier has purchased the business of Mr. S. C. Burris, architect and real estate agent, Victoria, B. C.

We regret to learn that Mr. Richard C. Windeyer, architect, of this city, has lately been incapacitated for his duties by illness.

Mr. A. E. McCall, B. A., has resigned the position of mathematical master in the Belleville high school and has gone to Ottawa to take a civil engineer's course.

On the occasion of his recent marriage, Mr. W. C. Phillips was waited upon at his residence, 21 Grosvenor street, by the travellers, salesmen and foreman of the Cobban Manufacturing Co., Toronto, and presented with a handsome silver tea service, as a mark of esteem and regard from his employees.

THE CANADIAN ARCHITECT AND BUILDER received a visit last month from Mr. A. P. Randall, of Seattle, W. T., who is re-visiting relatives in Ontario after an absence of fifteen years, during which period he has resided on the Pacific coast. Mr. Randall, who is a builder, is alive to the advantages to be derived from a study of the architectural journals, and before leaving added to his list of such publications the CANADIAN ARCHITECT AND BUILDER.

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

MANILLA HEMP IN PLASTER.

A WELL-KNOWN firm of architects has for several years ordered the use of manilla hair in all plastering work done for its clients. In order to satisfy the doubt of some of its contractors, they made the following experiment: The test was made with four plates of equal size, one containing manilla hemp, a second Sisal hemp, and third jute, and a fourth plasterer's hair (goat's) of the finest quality. The test was made by suspending pending weights from the middle of each plate, the ends of which were properly supported. The result was that the plaster mixed with goat's hair broke at 144½ pounds weight, that with jute at 145 pounds, the Sisal at 150 pounds, and the manilla at 195 pounds. It should be added that the plaster containing the manilla hemp did not break, it only cracked. Though cracked in the centre, the lower half of the plate containing the manilla when it was suspended, held on to the upper half, and the manilla held it fast, though the observer would almost feel confident that the hairs would break under the strain. The three other plates were broken—that is, the two parts of each plate had severed entirely in contrast with the manilla plastering. The architects felt that their theory had been proven correct.

Another experiment, made two years ago by a member of the same firm of architects, consisted of mixing two barrelfuls of mortar, each containing equal portions, by measure, of sharp sand and Thomaston lime, one of the barrelfuls, however, being mixed with the proper quantity, by measure, of manilla hemp, cut in lengths of 1½ to 2 inches, and the other of goat's hair, the best that could be procured. After mixing thoroughly with the usual quantity of water, the respective mixtures were put in the barrels and stored away in a dry cellar, where they were locked up. They were allowed to remain there for nine months, at the end of which time they were opened and examined. The hair mortar crumbled and broke apart, very little of the hair being visible, showing that the lime had consumed the hair. The other, containing the hemp, however, showed great cohesion, it being with considerable effort that it was pulled apart, the fibres of the hemp permeating the mass and giving little or no evidence of injury done to it by the lime.—*Manufacturer and Builder.*

ROOF CONSTRUCTION.

IN a southern climate it is not a difficult matter to place on a building a good weather tight roof, but in a northern one it is almost impossible to construct a roof which will remain perfectly watertight at all seasons of the year. A roof may not allow one drop of water to penetrate during the summer months, which in winter will leak a stream. The question of watertight roofing under all conditions of climate has now become a difficult one. In the past when our houses were not heated beyond the actual living rooms and water froze in the bedrooms, there was not very much trouble with leaky roofs except under very exceptionable circumstances. But now that our homes are heated with water and steam until there is not one single cubic foot of air in the entire house which is not at 65° or more, it it the exception when a roof does not leak less or more during the winter. This occurs through the extremely high temperature of the air underneath the roof, as no matter what the temperature of the house may be, the attic or roof space is still higher. The result of this state of affairs is that the snow on the roof is melted when the temperature of the air outside is below the freezing point, and the water melting therefrom runs down the roof until is reaches the eaves, where it is beyond the influence of the heated air of the house, and consequently freezes, the result being that there is a ridge of ice at the eaves of the house with long icicles hanging down from same. This ridge of ice prevents the water from the melting snow escaping off the roof except over this ridge, and as it keeps freezing it very soon has a dam sufficient to cause the water to back up under the slate and find its way down the face of the walls, or into the house. This ice forms at many points, but more especially at the eaves in the valley and behind chimneys and dormer windows. The temporary leakage is not the only trouble, for the roof is always more or less injured by the ice. The galvanized iron gutters, valleys and flashing are often damaged to such an extent that it is necessary to have them repaired to keep out an ordinary rainstorm, and very often the slate is broken to such an extent that they must be replaced.

To overcome this difficulty it is absolutely necessary that there should be few breaks in the roof. Every gable, dormer window, or chimney but adds to the trouble, and therefore every care should be taken to design houses which can be roofed in a simple and plain manner without unnecessary breaks, which are often put on to add to the design artistically, but which more often than otherwise ruin it. A broad mass of roof very often would redeem an otherwise inferior design. There are far too many houses erected which have not even one small untortured surface to rest the eye, tired in the attempt to understand what all the projection points and excrescences mean. Our buildings would gain very much if they were designed with more simplicity and dignity, both artistically and from the strictly utilitarian point of view. This trouble from ice forming on roofs in winter can only be overcome by preventing the heated air of the house striking the underside of the roof boards. If some means is adopted which will allow of a circulation of cold air underneath the roof boards no ice will be found, and the roof will remain as tight as during the summer months. This circulation can be secured by double boarding the roof and leaving a sufficient space between the boarding to allow of a current of air entering at the eave and escaping at the ridge. By this means the heated air of the house is prevented from coming in contact with the boarding on which the roofing material is laid, and instead, a cold column of air is maintained below this boarding which is continually carrying off any heated air which may escape through the first boarding. But all leaks in roofs are not caused through ice. Bad materials and workmanship has much to do with leaky roofs, and until rooters have been trained to do their work properly, there will always be bad roofing where there should be good.

TORONTO BUILDERS' AND CONTRACTORS' FEDERATED ASSOCIATION.

AT the last monthly meeting of the above Association held on Thursday evening, the 5th inst., after the ordinary business had been transacted the retiring president, Mr. Lionel Yorke, was presented by Mr. Geo. Moir, President elect, on behalf of the Association, with a handsome gold-headed cane. Mr. Yorke is too well known to call for any lengthy comments here, he having built some of the largest edifices in the city, and being now engaged in the erection of the new Parliament Buildings. He was the first president of the Builders and Contractors' Federal Association, and as such was untiring in his efforts to further not only the interests of the building trade, but also the interests of both the architect and the capitalist.

The peaceful settlement of the troubles last spring and summer were in great measure due to his large experience with workmen; his broad and sensible manner of looking at their side of the question as well as the masters', and his undaunted courage in bringing matters to a satisfactory conclusion even in the face of serious loss to himself. The fact that a general strike or lock-out, or in other words a general disaster to the city, was avoided during his term of office principally through his instrumentality, is sufficient reason alone for our wishing with the Builders' Association, that although the cane might be quite sufficient to support his bulky form, it may long be to him more for ornament than use.

PROGRESS OF THE PANAMA CANAL.

THE *Panama Star and Herald*, of May 19, says:—"The work on the locks is progressing finely. A large amount of work has been done during the three or four months in which the contractors under the lock system have had charge. Excavations have been made, and are being made, to secure the masonry of the head and foot of each lock, while the digging of the canal proper between the ends of the locks is keeping pace with the other work. The one who observes for the first time the construction of the canal, is a very interesting sight to see the large number of men, all activoly engaged; the numerous cranes lifting large iron buckets of earth and rock out of the excavations with ease and rapidity; the winches hard at work drawing large and heavy trains of the DaCanville dumping cars out of the work, up steep inclines; the engines working the pumps attached to the drainage wells, which drain the waters of the works; the rock-crushing machines crushing hard rocks into the requisite size for use in making concrete; all these things tell to the spectator the tale of a gigantic undertaking, well handled, and being rapidly pushed to completion.

"The locks number ten, all told, and are located five on the Pacific side, and five on the Atlantic side of the isthmus. Nearly all the latest improved labor-saving machinery adapted to such work is being used on the canals. There are about eight hoisting cranes on each lock (60 in all) of four tons hoisting capacity, and with a reach of about 10 metres depth, all busily engaged in hoisting large iron buckets of one cubic metre capacity, and unloading them upon flat cars upon trucks running out from the works to select dumping places. For the purpose of carrying the large amount of dirt and rock excavated out of the work there are about five locomotives to each lock and in all some 600 or 700 construction dirt carts.

"In places where they can be used, steam winches, of which there are some sixty to eighty on the entire work, draw up trains of DeCanville cars, fifteen or twenty of them to the train, and each of them of the holding capacity of half a cubic metre, running upon small tracks, placed in all directions, and running up and down steep inclined planes out of the works to dump.

"It is estimated that Lacks Nos. 1, 3, 4 and 8 will be turned over in three or four months.

"Most of the work now being done is done at the excavations of the heads of the locks, where the masonry will be needed, the work between, it is intended to carry on while the masonry is being erected and the gates, etc., placed in position.

"To this work of canal building there are now employed about 5,000 laborers on the ten locks and about 1,000 skilled laborers, besides a small, and yet not so very small, army of clerks.

HAMILTON.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

SINCE last report there has not been much change in building matters in this city; in fact there is little or no new building going on. There are a few private buildings in course of erection. Mr. Thomas Laury is erecting a fine detached villa residence on James street south, which will cost about $15,000 when finished. Mr. Strong, who has sold the last of his fine row of eight detatched houses on Stinson street, is about to commence the erection of another terrace of a similar class of buildings on Emerald street. Mr. Strong is quite an enterprising builder, and deserves credit for the taste he displays in getting up his buildings, both as regards exterior design and internal finish; in fact he has been a very successful speculative builder. He has also perfected some very useful improvements in sanitary plumbing and heating.

Owing to a delay in getting the stone, the stone wall on the new city hall has stopped, but the delay won't be long, when the building will be fast pushed on to completion.

The price of stock brick, that is to say the run of the kiln here, has been reduced one dollar per thousand. This is no doubt intended as an inducement for those who propose building to come on with their work, and I believe it will have a tendency in that direction. It will also be a good thing for contractors who have work on hand on estimates on the last month's prices.

The bad effect of the strikes by the workmen in the spring is now apperent to all right-thinking men, and none can perceive it so well as the workmen themselves. If they only profit by this year's severe lesson, it will prevent a repetition of such folly in any ensuing year. There is a prospect of work stirring up this fall; in fact there are indications that quite a mass of work may come in now that all hands are ready to settle down to business. I give no building record this month; in fact none has been made, except for a few paltry additions and alterations, which are not worth mentioning.

The Berlin waterworks are expected to be ready for operation by the middle of July, over a mile of pipe being put down each week.

The cast iron water pipes for the Montreal waterworks are being manufactured by the Steel Company of Canada, Acadia Mines, N. S.

A disagreement between capital and labor has resulted in closing down all the Pittsburg window glass factories for an indefinite period.

The Ormstown Brick and Terra Cotta Company has been incorporated with $50,000 capital stock. Its head offices are at Ottawa.

New Westminster, B. C., cedar is used in Montreal for finishing work in first class residences, and in Ohio for railway carriage purposes.

A sheet of building paper thirty miles long and 32½ inches wide was turned out of the Northumberland Paper mills at Campbellford, Ont., the other day.

Messrs. Harding & Leathorne have been awarded the contract for the construction of the Goderich waterworks, at a cost of between $8,000 and $9,000.

Mr. John Clark, architect, Chesley, Ont., states that thirteen stores and one hotel are now under way there, and that all the buildings are to be all brick.

Mr. B. Gibson, of Whitby, was the successful tenderer for the contract for extending the Kingston waterworks system. The amount of his tender was $30,800.

The work of plastering the interior of the new Departmental block has been sub-let by contractor Charlebois to James Strachan, of Ottawa. The amount is about $20,000.

The construction of the new Halifax dry dock is giving employment to 150 men. A large amount of excavating is being done. The contractor hopes to complete the work this year.

The construction of a spile flume extending 800 feet into the bay, has been found effectual for the purpose of preventing the drifting back to the shore of sewage from the Hamilton sewers.

The owner of the Hastings quarry, where the white marble is found of which it is proposed to construct the Toronto court house, has offered the stone free to the corporation for the quarrying of it.

Messrs. McLean & Whitehead, Winnipeg, have the contract for building snow sheds for the C. P. R. Co., on the Eastean slope of the Selkirk mountains, and Mr. D. B. Campbell, of Strathroy has a similar contract on the western slope.

Contracts for the construction of a new iron bridge over the Thames at Delaware, Ont., to cost $13,000, have been let as follows:—Mr. Isaac Crona, two stone piers, $8,000; Hamilton Bridge Co., iron superstructure. $5,130.

The Independent Workingmen's Association of Hamilton, composed of workmen in the building trades who do not belong to the unions, have elected the following officers:—D. G. Mowat, president; Henry Shelley and J. Fuller, vice-presidents; Geo. Worthington, treasurer; James Plumley, secretary; Jas. Bonner, inside sentinel; John Goodall, outside sentinel. Trustees—J. Burke, J. Fuller and E. Woolter.

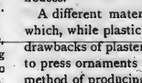
At the annual meeting of the Toronto Builders' and Contractors' Federal Association, the following officers were elected:—President, Mr. Gongre Moir; Vice-President, Mr. Frank B. Lockwood; Treasurer, Mr. Wm. Forbes, re-elected; Secretary, Mr. J. Knox, re-elected; Rooms Committee, Messrs. Forbes, Fiddes, Wright, Gibson and Lockwood; Auditors, Messrs. W. Simpson and H. C. Dancy.

The route of the proposed Trent Canal is from Wanbaushene, on the Georgian Bay, to Trenton, on the Bay of Quinte, passing through Lake Couchiching, Lake Simcoe, across country to Balcam lake, to Cameron's lake, to Sturgeon lake, to Stoney lake, down the Otonabee river, to Rice lake, to Meyer's lake, to Wilson's lake, and thence down the Trent river, to the terminus of Trenton. This route touches Orillia, Fenelon Falls, Lakefield, Peterborough and Campbellford. The Canal Commission will go over the route early in July, and hold meetings in the various places through which it passes, for the purpose of ascertaining what advantages the canal would afford local traffic.

In walls, bricks of any kind, but more particularly fire-brick, if properly laid in sound mortar or cement, will resist all effects of heat for a considerable time; for stairs, stone is a very dangerous material, unless it is imbedded on some substance which can carry it when it gets hot. But of all building materials there is none which require more extra care and delicate treatment than iron. Imagine a straight iron rod, supported, at its ends, and capable, at the ordinary temperature of the atmosphere, of carrying a heavy weight in the middle. Let a strong fire be lighted under it; in a few moments the rod will lose its straightness, first sagging in the middle, then dropping altogether, next fusing and running away. Yet this is a material which many persons call fire-proof, and put to carrying loaded floors which they designated by the same improper epithet. Wherever iron is used it should be protected by terra cotta, good brick work, sound plastering, or if nothing better can be found for the purpose, solid woodwork round it. Woodwork, if solid, will resist for a length of time every possible effort of heat short of actual flame.—*Builders Trades Journal.*

PAPER STUCCO, ITS HISTORY AND USES.

By W. H. ELLIOTT.



PREVIOUS to the introduction of paper stucco, the use of ornament in relief had at all times been considered the most desirable form of decoration for interiors, but on account of its cost it had been confined almost exclusively to public buildings and the mansions of the wealthy, if we except perhaps the conventional ugly centre flowers and heavy cornices composed of a shapeless bundle of mouldings framing an equally meaningless cove which are to be found in almost every ordinary house. The inclination of the artist towards relief effects was shown in the painted imitations of plaster stucco continually attempted. When neither the real nor the imitation in color was possible, simple wall papers of more or less merit were used with plain white ceilings, or worse still, white walls as well, it being considered, and with some reason, that an absence of design was preferable to an attempt at what was practically beyond the means of many who yet had the taste to avoid the gaudy effects of mediocrity. Decoration of the ceiling was out of the question, as nothing of a satisfactory nature was, or for the matter of that is now, furnished by wallpaper manufacturers; consequently that part of the room which from its position is most rarely interrupted, which presents itself from every standpoint as a whole, which is the longest flat surface in the room, and which, for these reasons, calls for decorative treatment, was absolutely treated with systematic neglect. We need not seek far for reasons. Even to-day clever, intelligent decorative artists are rare. We are all familiar with the badly drawn, badly colored ceilings in flat work to be met with even in dwellings of some pretension. Skilled decorators are to be found only in the larger centres of wealth and refinement. As a result, any attempt at meritorious embellishment of the ceiling required a great deal of time and money, both factors which nowadays must be approached with economy.

To overcome these difficulties the inventor of "paper stucco" sought for a substitute (not an imitation) for plaster of paris which should be within the range financially of ordinary decoration and at the same time crowd out the weak imitations in paint which were offered as a substitute. For grand and imposing buildings, no doubt plaster of paris possesses many good and acknowledged qualities; but for general use the objections to it are many. Aside from the score of expense already referred to, its production in an inhabited house is attended with an unendurable amount of dirt and fouling of the adjoining apartments. It is never safe, without special or expensive preparation, to burden an ordinary ceiling with a weight of plaster which may at any time, and indeed frequently does, fall and cause great damage. It is in addition certain to crack and separate with any settlement or shrinkage of the houses.

A different material, therefore, had to be obtained, which, while plastic in its nature, should be without the drawbacks of plaster of paris. After varied experiments to press ornaments out of materials of every kind, the method of producing plastic designs by means of layers of paper fastened together and pressed in moulds was hit upon and improved until we now have the varied and beautiful designs of paper stucco. That this method is the best for producing plastic ornaments of all kinds, and especially ceiling decorations, is proved by the fact that the original invention has now many imitations. For some purposes possibly a firmer pulp or stock can be obtained, such for example as *corton pierre*, which is capable in elastic moulds of more undercut effects, but no material at present in use combines so many advantages as "paper stucco." Not the least among its merits is the capability of shipment to any distance without damage in carriage. We have, then, a material which takes the place of plaster of paris, is free from the many defects of that material, and is cheaper in use even than the painted imitation of stucco. To those who would object to its composition as being only paper, it may be said that if it answers the purpose in view fully and satisfactorily, nothing further need be enquired as to its composition—that paper to-day is superseding many other materials in the greatest variety of uses—that as a matter of fact it is much more expensive pound

for pound than plaster. To compare it therefore as an imitation with plaster as the "genuine stucco," is absurd. Paper car wheels would not be called imitation iron car wheels. Paper boats, pails, bottles and vessels of all kinds are not looked upon as imitations of materials formerly used in the construction of these articles. It is not an imitation, but a substitute, superior to the old. The advantages to the architectural effect of rooms treated in relief ornaments are many. Weakness or faultiness of construction, irregularities, lowness or two great height of ceilings, may be overcome or modified by the proper disposition of ornament in friezes, cornices, mouldings, &c. Other materials for the flat surfaces, such as leathers, velvets, Lincrusta, gain immensely by the framing of mouldings in relief. While special laws govern the colouring of varied surfaces, yet the difficulties in the way of a successful effect, when the design is already provided, are not nearly so great as when both design and color have to be supplied.

MR. HOVENDEN'S REPLY TO HIS CRITIC.

88 KING ST. WEST,
TORONTO, July 6, 1888.

Editor CANADIAN ARCHITECT AND BUILDER:

IN your valued issue for June, I notice that I am the recipient of a castigation, as well as what purports to be some good advice, at the hands of the editor of the *Painters' Magazine and Coach Painter*, of New York, under the head of "Perverting Facts." Now, sir, if I were not already thoroughly well acquainted with the peculiar idiosyncracies, family heir-looms of such gentlemen as my respected New York brother of the brush, I should feel disposed to be offended at his remarks, as well as at the tone of his unsolicited advice; but I hasten to assure him that I am only amused, and as one good turn deserves another, I would respectfully advise him:

1st. Never call any man a liar, either in cold type, in writing or orally, on mere assumption, nor until you have the irrefragable proof in your possession, and not even then until after you have measured him up with a "two-foot" rule, and looked him well over in front and rear and on both sides, and made up your mind that your family will not be put to the expense of mourning.

2nd. Never write articles or criticisms on matters and men you are not thoroughly conversant with, and more especially avoid paints, oils, varnishes and painting, for although you may be an adept in the use of the paste pot, brush and scissors, this does not constitute you a *practical painter* by any means, or one qualified to wrestle with the intricacies of the paint and oil trade.

With these few words of advice, which I recommend to his most serious perusal and contemplation, and which, if followed out in the same kindly spirit in which they are given, will serve to prolong his days in the land of the Great Republic, and allow his grey hairs to go down in peace and honor to the grave, I will proceed to consider his random charges. He says first:

"Assertion is not proof. The assumed positiveness in giving the actual proportion of sophisticated barrels to the entire hulk supplied, excites incredulity in the speaker's honesty and sincerity."

I have read and re-read the above quotation from my learned brother's criticism, and have come to the conclusion, after mature consideration, that I am a "genius," for having performed the feat of exciting his incredulity, the more especially as he belongs to a people who are more celebrated for shooting wide of the target of truth than they are for scoring bull's eyes. Know then, oh learned brother, that I have asserted nothing but what I have proven time and again, and to my own satisfaction at least. As car loads of linseed oil pass through my hands pretty frequently, I will therefore assume—with your kind permission—to have a good opportunity of determining the quality of that particular class of goods, as I both sell and use them in large quantities. The "sophisticated" oil matter will therefore have to remain as a question of veracity on one side and incredulity on the other, as between my "unsophisticated" New York brother and myself, as I can't see where he has made out any case, or even succeeded in a poor attempt to disprove my statement.

Touching my remarks on "priming color," any painter with even a moderate knowledge of the trade will agree as to the soundness of the statement that the "odds and ends" of a paint shop are usually "fat," and will not dry hard and firm, no matter what you do with them, and make but a sorry foundation for the subsequent finish; for a thorough good foundation is as necessary to the finish and wearing properties of painting as a good foundation is constructively necessary to the stability of an edifice. His remark that "No one, of course, compels a painter to make up such a priming," may be taken as true, but he must not forget that painters are human, and like himself, perverse. They religiously follow, in the matter of their trade, that portion of the Episcopal service, to wit: "We have done those things which we ought not to have done, and have left undone those things which we ought to have done," &c.—which was the cause of my pointing out the result, if done in the manner alluded to.

My learned brother admits that "painters are by no means helpless sheep whose fleece are being torn by ravenous wolves." Unintentionally or otherwise, he has pretty accurately figured up the average painter. I have never heard their most intimate friends accuse them of "sheepishness," especially in the matter of making up bills, for which performance they rank next to the plumbers. But painters are pretty much the same the world over—at least, all that I have come across; they are neither better nor honester on his side of the boundary line than they are in Canada, and that is not lavishing a great deal of praise on either side.

As to architects across the line requiring to be "instructed in painting," I most respectfully beg to tender my critic my poor services, *gratis*, for the task, as I believe there would be a large field for missionary work over there if the architects are as sprightly and intelligent as himself. Regarding my poor self, I have to thank him for admitting that I show some symptoms of being a house painter. This is indeed an unlooked-for compliment from him, and very gratifying to me after having worked at the trade for over 38 years now, having served my apprenticeship in his city as a fresco painter, and having worked in nearly every good shop in days gone by from Portland, Maine, to New Orleans, La., and from thence north-westward to this city. Verily, his perspicuity is great and far reaching, and about on a par with his logic.

Yours truly,
R. J. HOVENDEN.

INTERIOR DECORATION.

AS a good example of interior decoration we may refer to that of a sitting-room facing the south-east. The ground of the wall is soft dull blue, that is blue with some green in it and of a softened faded hue, the ornamental figures being of lighter shade, the ceiling is of still lighter blue. The frieze is of brownish olive of the same depth of shade of the dull blue of the main wall ground, with running scroll border in old reds and olive greens separated from main wall by a redwood rail. The woodwork is in a shade of red-wood somewhat fainter. The whole has a restful appearance and is aided by a carpet of peacock blue ground, showing merely as a fillet running through olives, olive green, old blue and terra cotta reds, and by light bronze brown colored shades of windows. We have noted before the importance of taking the hues of the carpet into account when decorating a room. Where the carpet is not already selected the decorator should invariably be consulted on the subject; if already laid it will necessarily influence him in his selection of wall colors.

A northwest parlor has a wall paper in two medium shades of terra cotta pink; the frieze which is nearly two feet deep is in two shades of bronzy old gold, a renaissance design. In another parlor with wall space similarly treated there is a bold floral frieze of bronze green of continuous running pattern. The woodwork in each is the color of natural cherry. The library has a wall of bronze in arabesque design, the frieze ground dark old red, with designs in copper color; the ceiling pale bronze brown. The woodwork is in the warmest shade seen in French walnut. The newels at foot of staircase and hand-rail are of peacock blue; the balusters are ebonized. The woodwork of the bedroom is of a shade of bay green; in the wall paper amber and blue figures appear on a gray green ground; the ceiling is of a creamy hue.

A well decorated drawing-room which we lately inspected has the woodwork in peacock blue; the walls have a paper of conventionalized design in which blue predominates, whilst the doors are painted a yellowish olive green. The ceiling has a light pinkish hue. The ceiling of the dining-room in the same house is similarly tinted, the woodwork is of Indian red color resembling in appearance Japanese lacquer work; the wall paper is an all-over pattern in shades of Indian red, the frieze a yellowish green. Mouldings are in amber, yellow and pale shades.—*Painters Magazine.*

What is commonly called black lead, and used in lead pencils, is not lead at all. It is a carbon formation called graphite or plumbago. In this trade it is sometimes used in oil. It produces a beautiful gray with a metallic lustre, dries quickly, and has a good body. Chemists say that it is not injurious to other colors, and will live forever.

Painters and kalsomners are at present in demand at Deseronto, Ont.

White paint that has become discolored may be nicely cleaned by using a little whiting in the water while washing.

For varnishing fretwork, use white, hard spirit varnish; it requires no size; the application is to be made in a warm room; or fill in the grain of the wood with glue size, and varnish with brown, hard varnish.

A Mr. Myer has just patented in Germany a composition for removing old varnish from objects. It is obtained by mixing 5 parts of 36 per cent. silicate of potash, one of 40 per cent. soda lye, and one of sal ammoniac (hydrochlorate of ammonia.)

Three models of handrailing wreaths and tracing, cut on the "acris-cut sectional system," the invention of architect W. H. Croker, Orillia, Ont., were recently exhibited at an exhibition in Carpenters' Hall, London, England, and were awarded an extra prize.

A new material for decorative purposes called Pearline, consists of a material, apparently tin plate, with the surface so prepared that it reflects the light in broken masses, producing the effect of pearl shell. It is used as a medium for the display of hand painting. For panels, when so treated, it can be used quite effectively.

Oil spots on wall-paper caused by persons leaning their heads against walls may be removed by making the paste of fuller's earth and cold water and laying some gently on the surface to be cleaned, leaving it until dry, when it may be brushed off and the spot will have disappeared. It works best on plain paper, but it does not succeed so well on thoroughly colored.

Prof. Geo. Aitchison, A. R. A., in a recent lecture on "Decoration," said: When a full or deep scheme of color was settled on for decoration, white should be used sparingly, like a jewel, and when a light scheme was used black had the same value, while all pure colors, when employed on a white or very light ground, should be pulverized, or only light tones could be adopted.

To produce the effect of copper color, says the *Painters' Magazine*, take a ground color made of lead, ochre and either burnt sienna or Venetian red producing a warm buff; then get umber and burnt sienna and coat the whole work over with this, wiping on the prominent parts, carefully softening those parts down from the centre outward, leaving no harsh lines or clean patches, but softening all over, producing a metallic effect—being copper.

Italian jasper is a fine marble to imitate. The painter, having prepared a drab ground, oils this, and rules in circular forms of Indian red and bright lake. With a feather dipped in turpentine veins of different tints of orange, green, also grey, composed of white, raw sienna. Prussian blue and ivory black, are put in between these. The olive and grey tints are glazed with white, and the dark with crimson lake. The final touching up is given with very thin white on a feather.

The following are the names of the prize winners in the recent art examinations in connection with the Educational Department of Ontario:—Toronto School of Art—Gold medal, dinslie Borron. Ottawa School of Art—Gold medal, certificate for drawing from antique, O. E. Prudhomme. Bronze medal—Painting from life, F. Checkley. Bronze medal—Drawing from life, Carrie H. Ross. London School of Art—Silver medal—Mechanical course, Wm. Ferguson. Bronze medal—Primary course, Thos. Elliott. Morrisburg High School—Bronze medal—Primary course, Allen C. Smith.

The wide, shallow stairways that we are glad to say are slowly but surely superseding the breakneck flights to be found in all unpretentious houses afford the most delightful scope to those who are capable of making the most of the chances opened up to them. If there is a window on the first landing it should be cut low and a narrow divan placed in front of it, that one may take a breathing-spell by the way. An old eight-day clock may stand in the corner, beyond the window; or if you are not so fortunate as to own a clock of this description, a potted palm will look well. The opposite corner might have a large bracket holding a rather tall figure in a graceful posture. That of the celebrated disethrower would be admirable. A few well chosen pictures are hung at wide intervals along the whole ascent by people of unquestionable taste and judgment.

Herr Schick at Jerusalem has just lighted upon a supposed ditch of the long-contested second wall of the city, and has made other discoveries with reference to Constantine's Church which will compel a rewriting of the guide books. The French school at Mantiner has discovered a large circular building of the Roman period, with Bronze coins and inscribed terra-cotta tablets representing theatre tickets.

PUBLIC CONFIDENCE IN THE PLUMBER.

IN a paper read at the convention of the National Association of Master Plumbers held at Boston, June 27th, Mr. J. J. Wade, of Chicago, undertook to answer the question: "Does the plumber have the same confidence reposed in him as the family physician? If not, why not?" Mr. Wade's answer is in the negative, and he gives good reasons why the plumber has no right to expect the same amount of confidence to be reposed in him as in the physician. He points out that the physician is compelled to pursue a long course of study, pass many rigid examinations, and by virtue of his ability to cope with disease build up a practice. The accomplishment of all this forms a sufficient foundation upon which to rest public confidence. The case of the plumber is entirely different. "To the apprentice to the plumbing trade, unfortunately, even the rudiments of a common education are almost unknown, and he generally has no one to provide him with the necessary means to obtain this education. When scarcely able to handle the tools, he makes application to the master plumber to 'take him in' to learn the business. The master plumber, perhaps, favors his request and sends him out to assist a journeyman, and thereby acquire what knowledge he can. In some cases he may be placed with a man of intelligence, honor and integrity; but he rarely finds these qualities centered in the ordinary journeyman. Should such be the case, however, and if the boy possesses any good qualities, he will become, after spending the allotted time in probation, an efficient workman, and a good, honest character as well. But such experiences are seldom met with. We are often obliged to place our boys where they are best suited to learn the trade, which may be with a man who has no standard of morality whatever. From the force of association our apprentice imbibes the example of his indolent teacher and in all probability turns out the same reckless, indifferent mechanic who spends the precious time of his employer, not in the endeavor to attain perfection, but in watching the movement of the hour-hand in its journey around the dial. He is not obliged to pass any examination to manifest his ability, and so has to be continually under the supervision of the master or some fatal error will take place which may destroy a whole system of good plumbing."

Mr. Wade suggests the establishment of trade schools as the means to elevate the standard of plumbers and make them worthy of public confidence; also the adoption of legal means to obtain protection from incompetent workmen. In concluding his interesting paper he sums up the situation as follows:

What we want, then, are trade schools, whose pupils will inspire as much confidence, for skill and integrity in their line of business as the physician does in his.

Having considered the "plumber" at all stages, we have arrived at the conclusion that the qualifications necessary for carrying on the plumbing business are:

1. Technical education.
2. A special knowledge of the plumbing trade.
3. That the applicant at the termination of his apprenticeship must undergo an examination in all the branches relating to the trade before a board of experts, thereby proving himself capable of conducting business.
4. He must possess such qualities of character as energy, perseverence, honesty, industry and intelligence.

The electric light plant at Woodstock is under injunction, and as the contract with the gas company has expired the town is in darkness.

The following rule has been adopted by the Health Board of New York city: "The plumbing of all buildings executed under plans approved by the Board of Health after July 1, 1888, must be tested by the plumber in the presence of an Inspector of the Board, by means of the pressure test, the pressure to be applied as directed by the Inspector, and after all openings in the pipes have been securely closed by the master plumber or other person in charge of the work. None of the pipes shall be covered until after such test has been made and they have stood the test to the satisfaction of the Inspector."

EARTHENWARE DRAINS.

BY BENJAMIN KIRK, PLUMBING INSPECTOR, TORONTO.

TO the average builder this has been a matter of some considerable anxiety. The departure from the old system of "go as you please," to the present system of close inspection by city inspectors, has made the duties of the drain layer more difficult to perform inasmuch as greater skill is required to successfully execute the work in accordance with the requirements of the by-law. One of these requirements is that every drain for carrying sewage within the walls of a house or other building must stand a test (the water test is usually called for.)

Pure Portland cement properly worked into the joints with a small trowel should make sure work of the joints. If the joints were first packed with oakum, the same as for cast iron, the joints should be more uniformly filled with cement. I think that much of the difficulty in making earthenware drains water tight, is in not having sufficient cement in the bottom of the joint. Cement which has partly set should not be tempered up for use again, as it loses much of its adhesive power by the process.

The quality of the pipe is another item which contributes materially to the success or failure of the testing process. It should be well glazed, free from flaws and fire cracks, of vitrified fire clay, and the hubs large enough to receive a proper filling of cement in the joints. With fairly good cement, 24 hours ought to be sufficient to allow the cement to set hard enough to stand a fair water test. I have successfully applied it after five hours setting.

Another difficulty to be encountered is the stopping up of the drain to retain the water in the pipes long enough to test them. Various are the methods employed to this end. Some endeavor to stop up the main trap with rags, blue clay and mud, others will leave two or three lengths of pipe loose and stop up the end with cement or plaster of paris (the latter will not stand), and after the test break out the cement, replace the loose pipes and cement up the joints.

When the trap can be filled with blue clay it is the best, but the clay must be well worked and rammed into the trap, then it should be weighted down with something, or the water will raise it, and pass under it out into the sewer. An expansion plug with a rubber ring such as is used for testing soil pipes, might be so made that it could be inserted through a junction and expanded by means of a thumb-screw. This might afterwards be used for the air inlet, or it could be cemented over. It would be as well to have inserted near the front wall what is known as a "drain sentinel," which consists of a pipe having a longitudinal opening in it the full width of the pipe, with a cover secured in its place by bolts at each end. This would be convenient for cleaning or inspecting the drain at any time, and with a plug such as I have described, a test could be conveniently applied at any time. I believe that one of the manufacturers of plumbing supplies in this city is making plugs for testing soil pipes, and if he could sell them I presume that he would make testing plugs for drains also.

Great care is necessary to prevent the joints being broken while the cement is setting. The time consumed in making tests and repairing leaks is another item to be considered when estimating the cost of a drain. This is a serious item in earthenware drains, for it is difficult to find the leaks, and when found, it requires so much time to repair them owing to the setting of the cement. With cast iron pipe the leaks are easily found, and when found are easily repaired, unless the pipe itself is defective. Again, when drains are left open for four or five days while testing, as is sometimes the case, the banks become loosened and cave in, walls and piers are liable to settle. Although the first cost of earthenware pipe is much less than iron, I think that those who have undergone the experience here narrated, will agree with me that cast iron is the cheapest in the end.

Another trouble with drain laying is the difficulty of getting men who understand the work. The public is not in a position to intelligently discriminate in the selection of drain layers. This might be remedied by licensing drain layers the same as plumbers are licensed. One is just as important as the other. A defective drain is just as efficient in the diffusion of sewer gas through the house as a defective soil pipe. In nearly all cities where plumbing regulations are in vogue drain layers are licensed the same as plumbers, but we are only commencing here, and cannot expect to attain perfection at once.

The Master Plumbers, Toronto, have elected President W. J. Burroughes and Joseph Wright to act as examiners for all applicants for plumbers' licenses on behalf of the city.

The firm of Quintal & Hogue, plumbers, Montreal has been dissolved.

Port Arthur is moving in the direction of establishing a system of lighting by electricity.

The Whitby Gas and Water Company with a capital stock of $10,000 has been incorporated.

The Holly system of waterworks is being put in at Welland, Ont., at an estimated cost of $40,000.

City Engineer Bell, of St. Thomas, is looking about for a source from which the city may obtain a supply of pure water.

It is said that the natural gas well in Collingwood has a capacity of 2,000,000 feet a day, enough to supply a town of 20,000 inhabitants.

We are pleased to learn from a Brantford paper of the laudable ambition of the Local Medical Health Officer to make that the cleanest city in America.

Hamilton Local Board of Health is enquiring into the purity of the milk supplied to the residents of the city, and the medical Health officer has gone to New York to investigate the methods in operation there for testing.

The City Engineer of Toronto states that two Plumbing Inspectors are not capable of seeing that the Plumbing by-law is properly observed. There is little doubt that the statement is correct. The Council should increase the number of Inspectors, and thereby secure the proper enforcement of the law.

The Peterborough town buildings have been undergoing sanitary inspection, with the result, according to a local paper, that "the condition in which things were found one would hardly believe without seeing for themselves, and more than one councillor expressed astonishment that the officials were not attacked with typhoid fever long ago." There are many such death traps throughout the land.

Mr. E. R. Jones, superintendent of waterworks, Boston, Mass., recommends the following as a very quick and satisfactory method of thawing house-services if the pipes are straight: Cut the services inside the cellar-wall and put in a ⅝-inch round-way cock; then take fifty feet of 4-16-inch block-tin pipe with a funnel attached, into which hot water is poured, while the small pipe is pushed into the service as fast as the ice is thawed.

A limit to the rapidity of filtration has been generally adopted by the London water companies; it is represented by the passage of about 540 gallons of water through each square yard of the upper surface area of the filter in twenty-four hours, or two and a half gallons through each square yard of surface per hour. Water passed through well-constructed filter-beds at a rate not exceeding this becomes under ordinary conditions bright and clear.

Donald McDonald, a Louisville architect, has patented an invention to prevent water from freezing in the pipes. A small tube is taken off from each of the service pipes just behind the faucet. The tubes are then brought together from two valves, one hot water and one cold water. The valves are connected with a glass thermometer in such a way that when the temperature reaches freezing point the water is allowed to run, and as soon as the temperature rises above freezing point the flow instantly ceases.

The process of purifying sewage by passing through it currents of electricity has been patented by William Webster in England. The effect of the current, it is said, is to cause the solid particles held in suspension in the sewage to collect at the surface of the fluid within a few minutes. It is estimated by the inventor that the cost of treating the London sewage by this plan would be about $125,000 a year. The chemical method, if adopted would involve an annual expenditure of about $150,000 the electrical plan being therefore the more economical of the two.

"Twenty years ago," says a London newspaper, "no one knew of the association between pulmonary consumption and a damp subsoil; but statistics have fully proved the connection. In fifteen English towns recorded by Mr. Simon the deaths from consumption fell immediately when the subsoil was dried by a system of drainage. In Salisbury the deaths from consumption fell 49 per cent.: in Ely, 47 per cent., and Merthyr Tydvil, which gained least, had its death-rate from consumption lowered by 11 per cent. By statistics we were pointed to the high mortality from consumption in the British army, and especially in the Guards, due to confined air—a mortality which has been so affected by better ventilation of barracks that the consumptive death-rate fell in the Guards from 125 in 10,000 in the year 1858 to 16.9 in the year 1875; that is to say, the deaths from consumption alone in the Guards in 1875 was less than a seventh of the number in 1858."

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

BANFF, N. W. T.—A new Presbyterian church is to be erected here.

LOCHATE, QUE.—J. C. Willson & Co. will erect a pulp mill.

LINDSAY, ONT.—Tenders for the new post office are being asked for.

WALLACEBURG, ONT.—A $15,000 bridge is to be built over the Sydenham here.

GALT, ONT.—$7,000 will be expended this year in improvements on the United Presbyterian church.

LAKEFIELD, ONT.—On July 24th the villagers will vote upon a by-law to provide for a system of waterworks.

KINGSTON, ONT.—Mr. Page, Government engineer, will select a site for the proposed new dry dock in this city.

HOCHELAGA, QUE.—The works of the Canadian Pacific Railway Co. are to be enlarged at an expenditure of $300,000.

WINDSOR, ONT.—The Windsor Council has voted to issue $25,000 in debentures for the erection of a new High School.

BODDECK, C. B.—Tenders are wanted up to 15th August for a Court House building. Address J. L. Bethme Beddeck, C. B.

CALGARY, N. W. T.—A by-law will be submitted to the citizens July 28th to expend $6,000 on sidewalks and drainage.

VANCOUVER, B. C.—Plans have been prepared for a $50,000 opera house to be erected here by Mr. VanHorne, of the C. P. R.

PEMBROKE, ONT.—The Town Council is considering the subject of constructing a waterworks system at a cost of about $60,000.

ST. THOMAS, ONT.—The Council will borrow $30,000 for general improvements, and $7,000 for additional school accommodation.

PETERBORO, ONT.—It is proposed to spend $30,000 for a new Collegiate Institute.—The G. T. R. Company will erect a grain elevator here.

SHELBURNE, ONT.—A by-law for $20,000 will be submitted to the ratepayers of this place to secure a system of waterworks for fire protection and domestic purposes.

BRANTFORD, ONT.—There is talk of erecting a new armory to cost about $25,000.—A building for the headquarters of the city waterworks department is projected, to cost $8,000.

LONDON, ONT.—Plans are being prepared for additions to the insane asylum building to cost $15,000.—An effort is being made to induce the Grand Trunk Railway Co. to rebuild the car shops in this city.

HAMILTON, ONT.—The city authorities have applied to the Marine Department for permission to lay a conduct pipe of 600 feet along the Burlington Beach, and into deep water in order to supply the filtering basin.

WEST TORONTO JUNCTION.—A new Presbyterian church with a seating capacity of 800, will be built this summer.—A by-law will be submitted to the people asking them to vote money for the establishing of a system of waterworks.

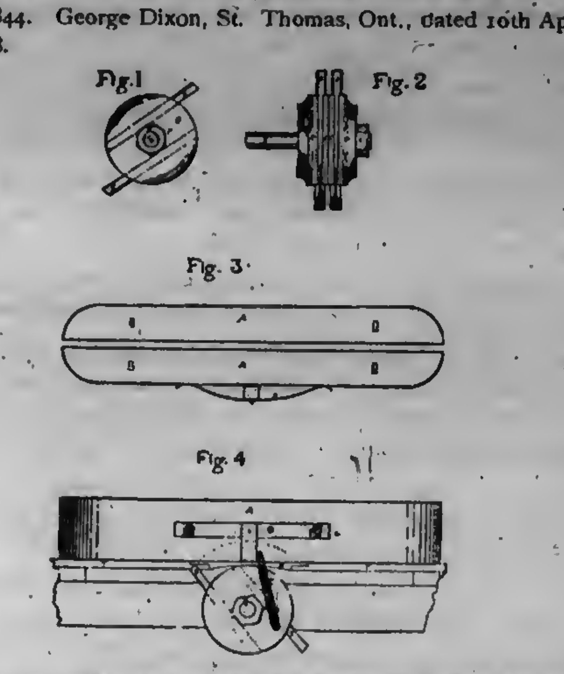
SARNIA, ONT.—Improvements to cost from $10,000 to $14,000 will be made to the high school. Besides a new addition, the building will be heated throughout with steam. Mr. S. H. Townshend, architect, of Toronto, has been entrusted with the work.—A new separate school building is to be erected at this place.

HULL, QUE.—Two Catholic churches will be built on the site of the one recently destroyed by fire.—This city will be a good spot for builders for some time to come, as it is expected that fully half a million dollars worth of new structures will be commenced shortly. These will include a Catholic church to cost $160,000; a convent, new city hall, etc.

TORONTO, ONT.—The City Council will issue debentures to the amount of $147,775 for the purpose of providing additional accommodation and increasing the efficiency of the public schools and for improvements to the Collegiate Institute.—A movement is on foot to enlarge the Trinity College buildings.—Some new buildings will be erected on Exhibition grounds.—The following permits have been issued from the City Commissioner's office during the past month:—J. Radford, 2 storey and attic bk. dwelling, Elm Ave., Rosedale, cost $7,000; G. C. Roach, 3 storey bk. store and dwelling, John street, cost $3,400; Thos. McCrossan, three 2 storey and mansard bk. stores, Agnes St., cost $4,600; W. Hughes, pair s. d. 2 storey and attic bk. dwellings, Simcoe St., cost $5,000; Chas. McCabe, pr. s. d. 2 storey and attic bk. dwellings, cost $8,000; B. Pearsall, pr. s. d. r. c. dwellings, Berkeley St., cost $3,000; Hon. John O'Donohue, add. storey and mansard, Adelaide and Church sts., cost $5,000; C. Dorsey, pr. att. 3 storey bk. stores, cost $7,000; W. McBean, ten bk. houses, Manning Ave. and Lennox sts., cost $30,000; Mr. Schubart, 2 storey and attic bk. dwelling, Sussex Ave., cost $3,500; A. W. Godson three att. 3 storey bk. stores, Queen st., west, cost $8,000; Elvidge & Milligan, twy pairs s. d. 2 storey and attic bk. dwellings, Manning Ave., cost $8,000; T. P. O'Callagan, bk. house, Sutton st., cost $2,500; E. H. Duggan, 2 storey and attic dwelling, Wilcox st., cost $5,000; Jas. Harved, 2 storey and attic bk. dwellings, Huron st., cost $6,000; Geo. Davis, pr. s. d. 2 storey and attic bk. dwellings, Hayden st., cost $3,400; Toronto Club, 3 storey bk. club house, corner York and Wellington streets, cost $50,000.

Machine for Raising Panels for Doors, etc.

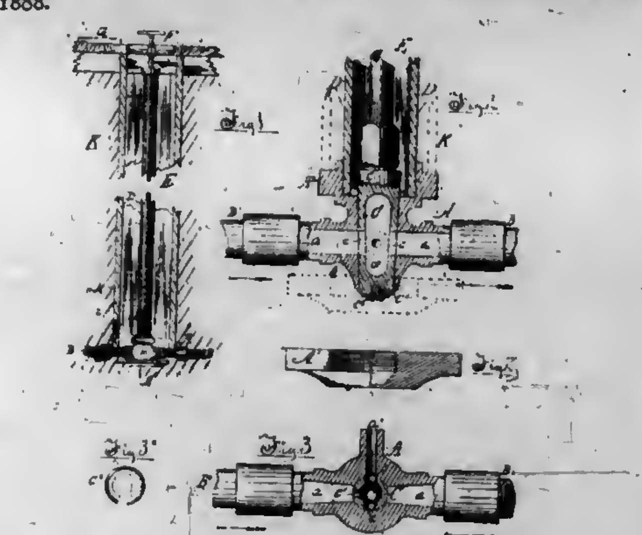
No. 28,844. George Dixon, St. Thomas, Ont., dated 10th April, 1888.



Claim.—1st. The combination of the cutters K, K and the collars *e, e, e, e*, substantially as and for the purposes hereinbefore set forth. 2nd. The combination of the bridge B and the guides *a, a*, substantially as and for the purposes hereinbefore set forth.

Devices for Operating Street Water Cocks.

No. 28,852. Frank Moses, Toronto, Ont., dated 10th April, 1888.



Claim—1st. In a device for operating street water cocks, the combination, with the stop cock and water pipes, of a rod in rigid connection with the valve, adopted to turn therewith and extending therefrom to the street level, and a pipe or tube joined to the valve shell and surrounding said rod, substantially as and for the purpose specified. 2nd. The combination, with the valve shell A and spigot C, of the vertical rod E, rigidly constructed to said spigot, tube D, joined to said shell, and an outer surrounding tube or casing K, whereby close connection is made between stop-cock and street level, for the purpose described. 3rd. The combination, with shell A, spigot C, washer *c2* and nut *c3*, of the cap A1, for the purpose specified.

The Toronto Pressed Brick Co. has been organized, and is making arrangements to manufacture at Milton, Ont., pressed bricks and terra cotta.

A German paper recommends a solution of paraffine in heavy coal tar oil for the purpose of protecting walls exposed to the weather. Papered walls which showed dampness in wet weather gave no traces of it after an external coating of this preparation had been applied. One part of paraffine and two to three parts of coal tar oil is solved in a moderate heat, sufficient oil must be used to prevent the solution from becoming sticky. The vessel containing it must stand in hot water while the paint is being applied, which must be done on hot days when the bricks or stone are thoroughly dry. One coat is sufficient.

PORTLAND CEMENT IN THE BUILDING TRADE.

TORONTO, June 20th, 1888.

Editor CANADIAN ARCHITECT AND BUILDER.

OF late there has been a gradual and almost imperceptible tendency to use a better class of cement in the building trade. Buildings are now of such a costly description that durability and perfect soundness in the foundations are amongst the first requisites, and these qualities are only to be obtained by using first-class cements.

There is a particular impression which is extremely erroneous, that a first-class cement, so called, should be quick setting, and the usual mode of testing cements after a short period of immersion in water is liable to make this impression a popular one. It should be marked, however, that these tests can only be relied on and considered as conclusive within certain very narrow limits. It is a positive fact that two cements of very unequal quality will give very similar results with a nine day's test for instance, while the same cements tested after a protracted, immersion in water and long exposure, will show a difference amounting to hundreds of pounds in the tension under which they will break.

That property which Portland has of hardening when exposed to dampness is due to it's power of absorbing and assimilating water, the more water being absorbed the harder the cement gets. In the quick-setting cement, this absorption takes place so rapidly that the outside layers only of cement of concrete attain their full degree of hardness, while the interior portion cannot undergo a uniform process of saturation—hence, a want of homogeneousness in the mass of concrete, and a consequent want of stability in the structures in which they are used. In a slow-setting cement this process of absorption is slower, but more uniform, and although it stands at a disadvantage in this one sense, the ultimate results obtained are generally more satisfactory.

As a rule quick setting cements should be avoided, except in light buildings and structures not subject to heavy strains; while moderately slow setting cements, thoroughly well ground and mixed, should be used in the foundations of heavy buildings, abutments for bridges, and all structures generally which are intended to stand heavy strains.

A thoroughly good and sound cement as a rule, will combine these various qualities to a moderate extent, and in this class may be mentioned such cements as Brook's Shoobridge's, Knight, Beven & Sturges', the Nine Elms brand and the Atlas brand of the Union Cement Co., lately placed upon this market by Messrs. T. McRae & Co., of Ottawa.

German cements and second grade English brands, such as Wallsend & Johnton's give very satisfactory results in tests made after a short period of immersion in water but prolonged exposure to the action of air and water does not materially increase their power of resistance to severe tests, and their use will eventually become more and more restricted as the class of works undertaken by our builders become more and more high class.

Some Canadian cements are becoming quite popular for certain purposes, but the native clay used in their manufacture does not appear to contain the necessary ingredients to make them stand high tests, and until this defect is remedied, they will scarcely be able to take the place of foreign cements. Advocating their use in such cases as that of the proposed King street subway for instance, where great strains and the effects of repeated vibrations due to the passage of trains will have to be withstood, is possibly a rash proceeding and certainly one of well intended but misunderstood economy.

L. BACQUE,
School of Bridges and Roads, Paris.

NOTICE TO CONTRACTORS.

TENDERS will be received by registered post, addressed to the Chairman of the Committee on Works, up to 2 o'clock p. m. of the 24th day of July, for the

KING STREET SUBWAY MASONRY AND EXCAVATION

Specifications and forms of tender can be obtained at the City Engineer's office, on and after the 17th instant. Copies of drawings may also be obtained on payment of $5.00, which will be returned on receipt of a *bona fide* tender.

A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 2½ per cent. on the value of the work tendered for must accompany each and every tender, otherwise it will not be entertained. All tenders must bear the *bona fide* signature of the contractor and his sureties (see specification), or they will be ruled out as informal.

The Committtee do not bind themselves to accept the lowest or any tender.

WM. CARLYLE,
Chairman Com. on Works.

Committee Room, Toronto,
July 10th, 1888.

TO CONTRACTORS.

SEALED Tenders, addressed to the undersigned, endorsed "Tenders for Works," will be received until noon on Monday, the 30th JULY instant, for the construction of the following works:

At the Asylum for Insane, London—Reconstruction of portion of main building injured by fire, new pumping engine and hydrants for fire protection and addition to the bursar's residence.

At the Asylum for Insane, Hamilton—Addition to the medical superintendent's residence and new pumping engine and pipes from engine-house.

At the Reformatory for Boys, Penetanguishene—Duplicate pump at engine-house and new water tanks.

Algoma District—Addition to registry office, Sault Ste. Marie.

Thunder Bay District—Addition to lock-up, Fort William.

Nipissing District—Courtroom and jail at North Bay.

Rainy River District—Additions to courtroom and jailer's residence at Rat Portage.

Plans and specifications can be seen at this department and at the above public institutions and districts, where forms of tender can be procured.

The bona fide signatures of two parties who are willing to become securities for the due performance of the contract to be attached to each tender.

Each tender for the works at London, Hamilton, Penetanguishene and North Bay must be accompanied by an accepted bank check payable to the order of the Commissioner of Public Works for Ontario, for the sum of $500, which will be forfeited if the party tendering declines or fails to enter into a contract based upon such tender when called upon to do so.

Where the party's tender is not accepted the check will be returned.

The Department will not be bound to accept the lowest or any tender.

C. F. FRASER,
Commissioner

Department of Public Works, Ont.,
Toronto, July 7, 1888.

THE LATE MR. WM. HAY, ARCHITECT.

THE many friends and acquaintances of Mr. Wm. Hay, architect, who resided in Toronto and practised his profession here for a period of twenty years, will regret to hear of his death, which occurred in Scotland about a fortnight ago. The Edinburgh *Scotsman* thus speaks of him:

"This gentleman, whose death was announced in our obituary yesterday, was a native of Cruden, and came to Edinburgh as assistant to Mr. John Henderson, architect, in 1844. After being engaged with him some years he became assistant to Sir Gilbert Scott, by whom he was sent to Newfoundland as clerk of works to the new cathedral there. At the completion of the works he removed to Canada and commenced business in Toronto, where he had a considerable and varied practice, extending to Bermuda, which he had to visit on several occasions. In 1864 he resolved to return to Edinburgh, where he continued in practice, and ten years since he assumed Mr. W. Henderson as partner. He will be remembered by many in connection with the restoration of St. Giles' Cathedral—a work entrusted to him by the late Dr. Sir. Wm. Chambers, and the admirable taste and judgment displayed in which have been universally acknowledged and admired. Immediately after this he proceeded again to Bermuda in connection with the erection of a new Government House and a new cathedral in place of Old Trinity Church, which had been destroyed by fire. He took occasion on this visit to make an extensive tour in America, in company with his wife and daughter, and had many meetings with old friends there. For many years Mr. Hay was a prominent Freemason, and for some years was Master of a Lodge in Toronto, and on his return to Scotland became Master of the Lodge St. Andrew, Edinburgh. He held for many years high office in the Grand Lodge and in the Supreme Royal Arch Chapter of Scotland, and was a Knight Templar, and a leading member of the Supreme Council in Scotland. By the Freemasons of Scotland his death will be deeply regretted. For the last eight months, owing to illness, he has been unable to leave his residence at Joppa, where his death took place in his 70th year. He had a large circle of friends, and was of a kindly and genial disposition, and ever ready to respond to a call of charity. He was a conservative in politics, and a zealous and devoted Scottish Episcopalian, and held several appointments in connection with the Episcopal Church."

Mr. Wm. Hay's arrival in Toronto in 1852 introduced here the revival of mediaeval architecture, which had already exerted an immense influence on the architecture of Great Britain and other portions of Western Europe. Possessed of a thorough knowledge of both the theoretical and practical parts of architecture, and having good taste, he soon acquired quite a large practice. His buildings were bold in outline and very correct in detail. Some of his principal works here were the Toronto General Hospital, Saint Michael's College, and Saint Basil's Church, the House of Providence and various private residences, through all of which the mediaeval feeling ran. Throughout the Province of Ontario—then Upper Canada—he had quite an extensive practice, both in church and domestic work. Mr. Hay's buildings to-day, after a period of over thirty years, hold their own with the erections now going up by virtue of the truth of the principles which guided him in his work. On Mr. Hay leaving this city, he left his business to Messrs Gundry & Langley, the latter of whom studied and was with him for seven years. Three years ago Mr. Hay revisited Toronto, and spent some time here with relatives and in renewing the acquaintances of former years.

At the recent general assembly of the Presbyterian church in Canada Mr Cumberland presented an overture on Church architecture, which was favorably received. He stated that many churches were being built in rural districts without any well defined plan, and which both from an artistic and utilitarian standpoint, were failures. We would not have a picture gallery in every locality, but we could have neat and suitable churches, built on the lines of architectural symmetry and harmony, and these would have an educational value to our people. A committee was appointed with Mr. Cumberland as Convener, which is expected to inaugurate a new era in church building, combining economy with beauty.

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$34 00@	35 00
1¼ and thicker, three uppers, Am ins.		40 00
1¼ and thicker, pickings, Am ins		30 00
1 x 10 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
2 x 10 and 12 dressing	15 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
2 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1¼ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	16 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		15 00
1½ inch flooring		15 00
XXX shingles, sawn	$2 40 @	2 50
XX shingles, sawn	1 30	1 50
Eastlake painted iron shingles, per square, (10,000 feet)		4 50
Eastlake painted tin shingles, per square		4 50
Eastlake genuine galvanized iron shingles, per square		7 00
Metalion brick siding, per square		3 50
Special siding, per square		3 50
Lath, sawn		1 80
YARD QUOTATIONS.		
Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		12 00
Shipping cull boards, stocks		13 00
Scantling and joist, up to 16 ft		14 00
" " 18 ft		15 00
" " 20 ft		16 00
" " 22 ft		17 00
" " 24 ft		19 00
" " 26 ft		20 00
" " 28 ft		22 00
" " 30 ft		24 00
" " 32 ft		26 00
" " 34 ft		28 50
" " 36 ft		30 00
" " 38 ft		32 00
" " 40 to 44 ft		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board	18 00	20 00
Dressing stocks	16 00	18 00
Picks, American inspection		40 00
Three uppers, American inspection		50 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 4 x 14, per M		12 00
B. M.		
1¼ inch flooring, dressed	25 00	30 00
1½ " rough	14 00	15 00
1¼ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		2 25
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

BRICK.—℔ M.

Common Walling		$ 7 50
Good Facing		10 00
Sewer		9 50
Stone:		
Common Rubble, Per Toise, delivered		14 00
Large flat " " "		18 00
Foundation Blocks, " Cubic Foot		35
Slate: Roofing (℔ *square*).		
" green	5 00	6 00
" " unfading	5 00	6 00
" purple	5 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me	5 50	8 00
" black slate		7 50
Tiles, American, ℔ M.		
N. Peach Bottom, warranted unfading		—
Sand:		
Per Load of 1½ Cubic Yards		1 25

PAINTS. (*In oil, ℔ lb.*)

White lead, Can	6	6 50
" zinc, Can	6½	8 50
Red lead, Eng.	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" Indian, Eng.	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (℔ *Imp. gal.*)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3
Whiting, dry	75	1 00
Paris white, Eng., dry	1 25	1 50
Litharge, Am., "	6½	8
Sienna, burnt	15	20
Umber, "	8	12½

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey		40
" " " White		60
Plaster, Calcined, New Brunswick		2 20
" " Nova Scotia		2 10
Hair, Plasterers', per bag		1 00
Cement, Portland, per bbl		3 00
" Thorold, "		1 50
" Queenston, "		1 50

HARDWARE.

Cut Nails:		
American Pattern, 1¼ inch, per keg		4 50
" " 1½ to 1¾ inch, per keg		3 75
Canadian Pattern, 1¼ inch, per keg		$ 4 00
" " 1½ to 1¾ inch, per keg		3 50
" " 2 to 2¼ inch, "		3 50
" " 2½ to 2¾ inch, "		3 25
" " 3 inch and larger		3 00
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg		6 05
" " 1¼ inch, "		5 30
" " 1½ " "		5 05
" " 1¾ " "		3 60
" " 2 inch and larger		4 00
Iron, etc.		
Refined, ℔ 100 lb. or ordinary size	2 25	2 35
Common, ℔ 100 lbs	2 00	2 10
Patent metals, ℔ lb.	0 00	0 11
Anchors, ℔ lb.	0 05½	0 06
Chain cables, ℔ lb.	0 03	0 06
Rigging chains, per lb.	0 03	0 3⅓

MONTREAL PRICES.

Lumber, Etc.		
Ash, 1 to 4 in., M	$13 00@	25 00
Birch, 1 to 4 inch, M	15 00	25 00
Basswood	13 00	20 00
Walnut, per M	60 00	95 00
Butternut, per M	30 00	40 00
Cedar, flat	00 04	00 06
Cherry, per M	60 00	80 00
Elm, Soft, 1st	15 00	17 00
Elm, Rock	25 00	30 00
Maple, hard, M	20 00	25 00
Maple, Soft	16 00	18 00
Oak, M	40 00	60 00
Pine, select, M	35 00	40 00
Pine, 2nd quality, M	32 00	30 00
Shipping Culls	14 00	16 00
Mill Culls	8 00	10 00
Lath, M	1 75	2 00
Spruce, 1 to 2 inch, M	10 00	13 00
" Culls	4 50	6 00
Shingles, 1st quality	2 00	3 00
" 2nd "	1 25	2 00
Cement, etc.		
Portland Cement, per barrel	$ 2 75@	3 25
Roman " "	2 75	3 00
Fire Bricks, per M	22 50	27 50
Cut Nails:		
Hot-cut Am. or Can. pattern, 3 inch and above		$2 90
Hot-cut Am. or Can. pattern, 2¾ inch and above		3 15
Hot-Cut Am. or Can. pattern, 2¼ and 2 inch		3 40
Am. pattern, 1½ and 1¾ inch hot-cut		3 60
" 1¼ inch " "		4 40
Can. Pattern, cold-cut, 1½ and 1¾ inch		3 40
" " 1¼ inch		3 95
Finishing Nails, per 100 lb. keg, 1¼ and 1½ inch	$ 5 55	4 80
Finishing Nails, per 100 lb. keg 1½ to 1¾ inch	4 55	4 30
Finishing Nails, per 100 lb. keg, 2 inch and up		3 00
Paints, etc.		
White Lead, pure, 25 to 100 lb. kegs.	5 50	6 50
" No. 1	5 50	5 75
" No. 2	4 75	5 25
" No. 3	4 50	4 75
dry	5 50	6 00
Venetian Red, English	1 50	1 75
Yellow Ochre, French	1 25	3 00
Whiting, London, washed	0 50	0 60
" Paris, "	1 15	1 25
Oils:		
Linseed, raw	0 59	0 68
" boiled	0 62	0 60
Olive, pure	1 00	1 03
" machinery	0 95	1 05
" extra, qt., per case	3 00	3 50
" pts., "	2 40	2 60
" ½ pts., "	2 70	2 60
Spirits turpentine	0 50	0 90

ST. JOHN, N. B.

Lumber.		
Spruce deals, Bay Fundy Mills	8 00	8 25
Spruce deals, City Mills	8 50	9 50
Aristook P. B., Nos. 1 and 2	40 00	45 00
No. 3	30 00	35 00
No. 4	15 00	20 00
Aristook P. B. shipping	15 00	16 00
Common	12 00	13 00
Spruce boards	7 00	8 00
Spruce scantling (unst'd)	7 00	8 00
Spruce, dimensions	11 00	14 00
Pine clapboards, extra	5 00	40 00
No. 1	0 00	30 00
No. 2	30 00	20 00
No. 3	11 00	12 00
Laths, spruce	1 25	1 35
Laths, pine	5 50	8 00
Palings, spruce	5 50	8 00
Iron, etc.		
Refined, ℔ 100 lb or ordinary size	2 25	0 00
Common, 100lb	2 10	0 00
Patent metals, ℔ lb	0 00	0 11
Anchors, ℔ lb	0 00	0 00
Chain cables, ℔ lb	0 03	0 06
Rigging chains, ℔ lb	0 03	0 3⅓
Nails.		
Cut, 3d, ℔ 100lb	3 75	4 00
Cut, other sizes	2 74	3 50
Ship Spikes	3 70	5 00
Galvanized	5 25	6 50

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Woodstock, Feb. 16, 1888.

E. & C. GURNEY CO., TORONTO.

Gentlemen,—The No. 32 Hot Water Heater we bought of you for heating our office is doing splendidly. When it was being put in we frankly admit we had serious doubts if a heater which appeared so small for the duty required of it would warm the office sufficiently during the severe cold of winter. We are pleased to say, however, that during the days of intense cold through which we have just passed, our offices have been really uncomfortably warm, and this, too, without any forcing of the fire. The consumption of coal has been very light, and we have to express our perfect satisfaction with the heater.

Yours truly, THE PATTERSON BROS. & CO., Ltd.

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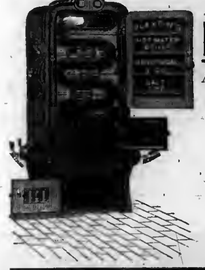
HOT WATER BOILER



Most Direct Heating Surface. Greatest fire Travel, consequently more Heat utilized from fuel. Easiest Cleaned and Managed, and Cheapest Boiler made when foregoing points are taken into consideration.

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— FOR —

City & County Buildings

Tenders addressed to the undersigned will be received through registered post up to noon on

MONDAY, AUG. 6th, 1888,

for the following works required in connection with the erection of the new Court House and City Hall for the City of Toronto and County of York, viz.:—

(1) Masonry, Rubble, Cut Stone, Brickwork, etc.
(2) Copper and Galvanized Ironwork.
(3) Steam Heating, Plumbing, etc.
(4) Painting and Glazing.
(5) Plastering.
(6) Wrought and Cast Ironwork.
(7) Roofing.

PROVISION AS TO STONE TO BE USED.

The Council have decided that the building must be constructed of either of the following kinds of stone:—

(a) Hungerford white marble.
(b) Queenston greystone, with New Brunswick brownstone trimmings.
(c) Pelee Island stone, with New Brunswick brownstone trimmings.
(d) Credit Valley greystone, with Credit Valley brownstone trimmings.

Kingston red sandstone may be substituted for New Brunswick brownstone or Credit Valley brownstone.

Plans and specifications for the masonry, rubble, cut stone, brickwork and steam heating, plumbing, etc., may be seen at the office of the architect, Mr. E. J. Lennox, south-east corner of King and Yonge Streets, Toronto, at once.

Plans and specifications for the remaining work may be seen at the architect's office on and after WEDNESDAY, THE 25TH DAY OF JULY, 1888.

Separate or lump tenders for the above trades will be received.

Each tender must be sent in on printed forms, which will be supplied by the architect.

Tenders over $100,000 to be accompanied by a marked cheque (payable to the City Treasurer) or a cash deposit equal to one per cent. on the amount thereof. Tenders under $100,000 to be accompanied by a marked cheque or deposit equal to two and one-half per cent. on the amount thereof.

The deposits of unsuccessful tenderers will be returned as soon as the tenders are accepted by the Council.

Deposits of successful tenderers will be held until the contracts are executed and satisfactory security given for the proper completion of the work tendered for.

Any party whose tender is accepted failing to carry out the same will forfeit his deposit.

The lowest or any tender not necessarily accepted.

The above conditions and conditions embodied in form of tender must be strictly adhered to in tendering, as informal tenders will be ruled out.

JOHN JONES,
Chairman Court House Committee.

City Hall, Toronto, July 7th, 1888.

Readers of this journal will confer a favor on the publisher by mentioning "The CANADIAN ARCHITECT AND BUILDER" when corresponding with manufacturers and dealers with reference to articles advertised in these columns.

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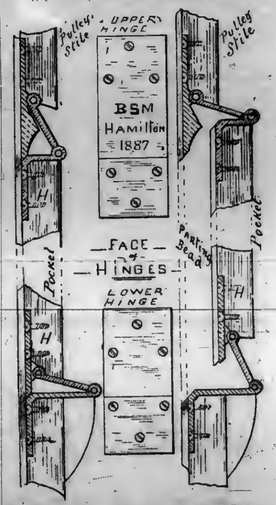

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WITH the above hinges the ordinary double hung window sashes can be taken out of the frames for cleaning, &c., without disturbing the stops or parting heads, and are the result of long experiment, to insure strength and perfect action. The parting beads are cut to mitre, and slide in with the pockets H, to clear the check of sash—thus the sash recedes in at one side, and clearing the opposite parting bead is taken out, the pulley boxes are in the pockets H, and the lines are held in a lock plate on inside of sash by means of a knot on the end of the line, which is released and run up to the pulley box in taking out the sash. The attention of architects and builders is called to these hinges. For further information and price apply to the inventor,

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117 KING ST. WEST, - HAMILTON, ONT.

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VOL. I.] The Canadian Architect and Builder. [No. VII

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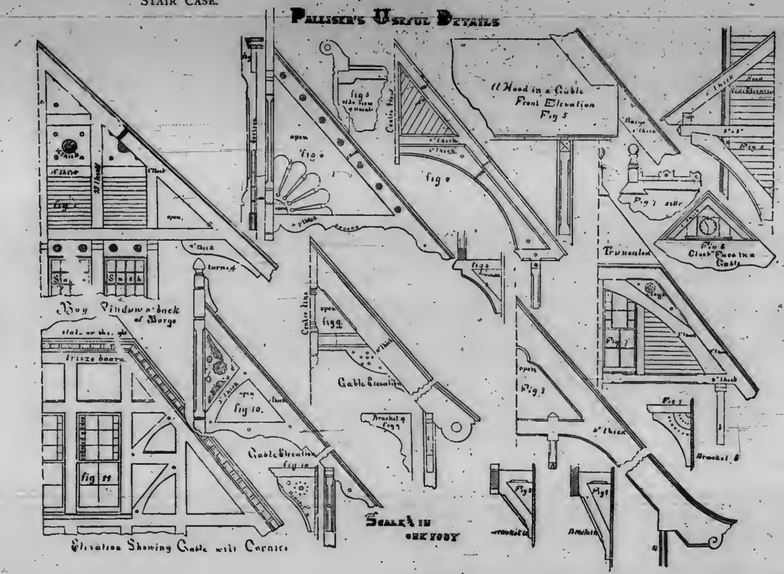
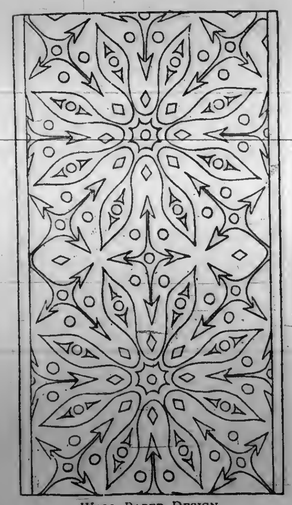
JAMES WRIGHT, ARCHITECT.

STAIR CASE.

WROUGHT IRON FENCE DESIGN.





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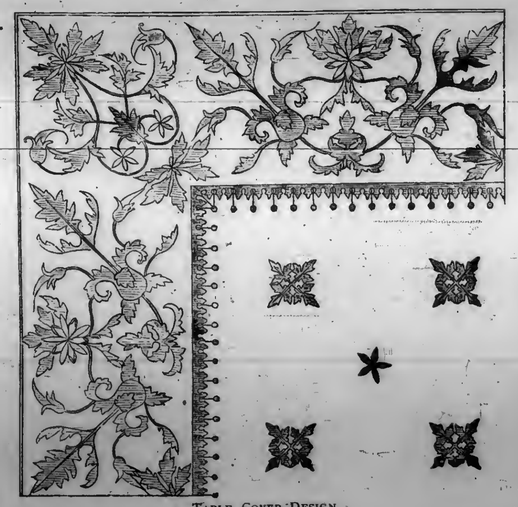

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VOL. I.—No VIII. TORONTO, CANADA, AUGUST, 1888. PRICE 20 CENTS $2.00 PER YEAR.

THE

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

PUBLISHED MONTHLY IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DEORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

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The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontioued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued uotil instructions to discontinue are received and all arrearages are paid.

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rices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Coatributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if fouod to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

A JOINT committee composed of representatives of the American Institute of Architects, the Western Association of Architects and the National Association of Builders met in New York recently and agreed upon a uniform contract which will be submitted to architects and builders for general use throughout the United States. Should a form of contract be devised which will meet with the approbation of persons interested, a similar document should be agreed upon for use in this country.

THE Government analysts have performed a highly commendable act in securing and analyzing water used for drinking purposes in various parts of the Dominion. The analysis of these samples proves that only about one-third of the drinking water in use can be designated pure. Many of the most impure samples analyzed were obtained from wells situated near school houses, from which probably the school supply of drinking water is obtained. This fact ought to be sufficiently alarming to parents to compel them to adopt sanitary measures to preserve the lives of their children. Could they but know how many cases of typhoid among public school pupils have had their origin in polluted well water there would be less indifference manifested in this important subject.

WE observe with pleasure that it is proposed to erect a suitable memorial to mark the scene of the battle of Lundy's Lane. The Lundy Lane Historical Society has submitted to Col. Otter, of this city, the following suggestion for the proposed monument: That a space of at least 25 feet square be secured at or near the highest part of the hill, and that suitable access thereto be made from the doorway. 2. That a stone tower be erected at a height of not less than 80 feet square exclusive of flagstaff, and of a width of diameter at the base sufficient to afford a suitable room for the exhibit of relics or trophies of the battles fought in the neighborhood, the room to have an area of not less than 200 square feet. 3. The material to be of Queenston limestone, but other stone may be used in relief, if compact and durable. The erection of monuments of this kind to mark important events in the history of the country, will exert a powerful influence on the minds of future generations of Canadians, awakening in them a pride of country which is a necessary foundation to the greatness of any nation. It is surely fitting that the designing of these national monuments should be entrusted to Canadian artists, and we hope that the patriotism which prompts the erection of such a memorial will extend also to the designer.

CHARGES of unfairness are being preferred against the City Council of Brantford in connection with the awarding of the contract for the construction of the new waterworks system. Certain of the Brantford papers, as well as those of outside towns, are alleging that the Waterous Company were given the figures in the American Company's tender, and were allowed to take advantage of this information by putting in a lower tender after the time specified for receiving tenders had expired. We have no information which would warrant us in expressing an opinion as to the truth or falsity of these charges. The circumstance, however, recalls the disgraceful proceedings which characterized the purchase by the city of Toronto of a new pumping engine four or five years ago. The wire-pulling and trickery connected with that transaction was sufficient to show that the man who can bring the most "influence" to bear upon the aldermen almost invariably gets the advantage of the man who relies upon his reputation for honesty and the figures in his tender to secure him the contract. We hope that when the facts of the Brantford case come out, if they ever do, it will be seen that the contract was honestly awarded. If that should turn out to have been the case, everyone will be pleased that a local and not an American company received the contract.

WE desire to say a word or two on the subject of illustrations for publication in this journal. We have of late been compelled to decline to publish many of the illustrations sent to us for that purpose, on account of the lack of merit displayed in design and drawing. We confess that in two or three instances we have published drawings sent us that were by no means up to the standard, but we did so simply because we desired to give all parts of the Dominion fair representation. When we commenced the publication of the CANADIAN ARCHITECT AND BUILDER we determined to illustrate the best work of which we could procure drawings. Although, for the reason given, and from a desire to encourage our readers to send us drawings, we allowed ourselves to be led into publishing some that had but little merit, we shall in future avoid doing so. We have many Canadian architects who are capable of producing creditable designs and drawings, and is not fair to Canadian architecture to publish illustrations that are not fairly representative of the best work done in this country. Unfortunately the authors of some of the drawings sent to us appear to be unable to distinguish as between good work and bad, so far at least as their own productions are concerned. If they could thus judge, they certainly would not be so ready to send abroad over this continent and Europe specimens of third-class architecture and drawing with their names as authors attached. In thus declining to publish inferior drawings, we shall be doing a kindness to their authors, and shall feel that we are not guilty of misrepresenting to the outside world the preponderating quality of the work done in this country. We make this statement with no desire to discourage any one from sending us specimens of work for illustration. We simple reserve the right to publish or not, basing our decision in the matter entirely upon the merits of the designs and drawings. We invite those who are capable of good designing and drawing to send us specimens of their best work for publication.

OPINIONS *pro* and *con* are being expressed through the columns of the newspapers regarding the practicability of the scheme for the construction of the proposed Trent Valley Canal. Great differences of opinion exist also regarding the amount of traffic which would be likely to find its way through the canal, and the consequent amount of revenue which could be counted on to assist in recouping the Government for the vast outlay which would be required to carry out the undertaking. We hope the discussion of the question will continue until all the information possible has been obtained. The necessity for the canal should be established, and also the probability that it will pay the cost of maintenance and interest on the capital used in its construction before any steps are taken to carry out the scheme. It is quite natural that people living and owning property along the route of the proposed canal should be enthusiastic advocates of the carrying out of the work, but inasmuch as the people of the country at large will be asked to shoulder the burden of its cost, the question to be considered is—will the undertaking pay? We are already, for a young country, to lerably well supplied with railways and canals; we are paying a very large sum yearly in interest upon the money borrowed to construct them, and we should absolutely refuse to increase our burdens in this direction without being first satisfied that further expenditure is absolutely required and will make us profitable returns.

THE plumbers' strike in this city seems as far from being settled as ever. Indeed an adjustment of the difficulty now appears much more difficult than it would have been when the strike began. Both parties to the dispute have acted in a manner calculated to widen the breach rather than to promote a mutually satisfactory understanding. We have so far not seen any statement made as to the grounds upon which the journeymen ask for such a substantial increase of wages. It cannot be said that the plumbing business is in such a prosperous condition as to warrant the employers in increasing by one-fourth their wages bill. On the contrary, the outlook for the master plumbers of this city is by no means bright. The large amount of speculative building done during the last three or four years has greatly diminished this season, and is not at all likely to revive for some time to come. There are already houses enough erected to supply the wants of tenants for two or three years at least. Building operations in this line will consequently be on a very much smaller scale than heretofore. The large amount of speculative building done of late created a demand for a cheap kind of plumbing, and induced a considerable number of persons to embark in the plumbing business. As a consequence journeymen found their services in demand. If a continuance of that condition of affairs might be counted upon, there there might be some ground upon which to claim an increase of wages. Seeing that the amount of plumbing required during the next two years is likely to be at least twenty-five per cent. less than during the last two years, the action of the journeymen must be regarded as either very thoughtless or very unreasonable. On the other hand, the refusal of the employe s to consult with the strikers or to agree to an

arbitration was in our opinion not a wise procedure. Apart from the question of wages, the unions want to have a hand in regulating the employers' shops. The latter insist that so long as they pay the salaries they intend to manage their affairs in the way that seems to them best. This we think they have a perfect right to do. The members of the union may refuse to work for an employer who thus insists upon being the sole manager of his business, but they have no right to interfere as they are said to be doing with workmen who are satisfied to receive their wages and leave their employers to do the managing. A couple of the strikers have been heavily fined by the police magistrate for alleged intimidation of workmen brought from other cities to fill the positions which they had vacated. Our sympathies in this instance are with the strikers, as we cannot see from the evidence wherein the intimidation took place. Since the decision of the police magistrate, however, some of the strikers appear to have resorted to intimidation and even to violence in order to prevent the employers from carrying out their contracts. The fact that the workmen imported by the masters have had to be guarded by the police, does not reflect much credit upon the methods of the strikers, nor does it tend to arouse public sympathy in their behalf. In conflicts with the employers the unions should discard physical violence and the boycott as likely to defeat rather than promote the objects they have in view. Since the above was written the steam fitters have joined in the strike, and the situation is thus made worse than before.

THE Toronto Trades and Labor Council has resolutely set its face against the movement to instruct the pupils of the public schools in the rudiments of practical mechanics and in the use of tools. The Council recently appointed a deputation to wait on the Minister of Education to endeavor to persuade him not to carry out the proposal. The result of the interview is thus stated in the Committee's report to the Council :—

"Your committee, as per instruction of your body at a recent meeting, secured an interview with Hon. G. W. Ross, Minister of Education for the Province of Ontario, for the purpose of laying before him the views of your body respecting this proposed scheme for introducing manual training in the public school system, with a commencement in the Provincial Model School at Toronto. Your committee were received with that courtesy and urbanity characteristic of that honorable gentleman, and at his instance each member of the deputation, which included the president of your body, spoke his views on the subject, and in opposition thereto. During the two hours' discussion of the question in all its phases every feature of the proposed movement on the part of the Ontario Government received ample consideration, and during which the honorable the Minister of Education, while holding strongly to his contention that no injury to, or interference with mechanical interests was intended or possible through the intended innovation, affirmed his adherence, for the time being at least, to his own view of the subject. Your committee, failing to convince him of the soundness of the views of your body, or those of your committee, in opposition to the manual training feature already referred to, and, being still satisfied that, if inaugurated, a course of manual training, as outlined by the Minister of Education, will result in no good at all commensurate with the amount of certain harm in an aggravated form which must ultimately ensue to all who live by mechanical callings in Ontario, unhesitatingly recommend that every legitimate effort be put forth by your body, by seeking the active co-operation of all labor organizations throughout Ontario in petitioning the Government, and Parliament when in session, and the taking such other action as may be deemed advisable in opposition to the adoption by law of this scheme on the lines outlined."

We very much regret that we have not before us the arguments presented by the deputation to the Minister in support of their contention that manual training in the public schools would result in "certain harm in an aggravated form, to all who live by mechanical callings." Let us hope that they were more logical than the reason before given by the Council, viz., that such training would tend to swell the ranks of botch workmen. Experience has demonstrated that youths who have had the advantage of technical instruction previous to entering the workshop, as a rule make more rapid progress and attain to a higher standard of skill than those without such training. This fact goes to prove that the tendency of the training is to increase the number of highly skilled mechanics rather than to create botches. But supposing the result should be the reverse of this, union men who are skilled mechanics would not suffer in consequence, for the simple reason that a botch can never do the work of a skilled mechanic.

Unfortunately, the labor organizations have devoted all their attention to securing for their members the largest possible remuneration for the least amount of work, regardless of whether they are botches or skilled workmen. No effort has been made to elevate the standard of workmanship. No standard of workmanship is required as the condition of membership in the organization. The declaration of American independence begins with the statement that all men are born free and equal. The trades organizations appear to work on the principle that all men—mechanics at least—are equal in their capabilities, and continue to be so during their lifetime. A standard of wages is fixed for all alike. No encouragement is offered to a man to strive to excel in the particular trade in which he may be engaged. For this reason we find about as many botch workmen in the membership of the labor organizations as out of it. Manual training in the schools might be expected to assist in developing a class of educated mechanics whose skill would entitle them to supplant many indifferent workmen of the present day who claim first-class remuneration for their services, not because of their ability to earn it, but because they are members of a labor organization which demands that they shall have it.

A representative body of workingmen is certainly the last quarter from which opposition should come to a movement which has as its object the imparting of a class of knowledge calculated to prove of practical benefit to the boys and girls whose circumstances in life or whose natural inclinations and adaptability destine that they shall engage in mechanical pursuits. As we pointed out in these columns recently, the class of instruction heretofore given to the pupils of our public schools has tended to overstock the ranks of the professions at the expense of mechanical pursuits. Yet the moment that an attempt is made to correct the error, the persons whose children would be most benefitted thereby are the first to throw obstacles in the way. We can only infer that they would rather see their children struggling to attain a bare livelihood as lawyers, doctors or some other "genteel" calling than earning a competency in the less crowded through humbler pursuits of life.

We are not surprised that the Minister of Education remains unconvinced by such short-sighted reasoning. We hope that he will persevere in his purpose, in which case no one will be less liable to suffer injury than the working mechanic.

WOOD FOR DECORATIVE PURPOSES.

IT is evident that much as we know about woods there yet remains much to learn that may be of value in the arts, says an exchange. The secret of making good veneers which will not warp is only now becoming known, and until lately it was considered impossible to emboss wood ; but now beautiful embossed panels, whose work resembles carving and whose richness compares favorably with the most costly art, are found in many places. In these the original patterns are carved by hand, and from these molds are made on which the wood is placed after being properly softened. The wood in these molds is then submitted to 250 degrees of heat and subjected to great pressure. Such a pressure effectually prevents all shrinkage. Wood may be cut as thin as the 300th part of an inch, but in this state is not useful. That which is cut to the thickness of the 100th or the 150th part of an inch and lined with paper is used for the decoration of walls and ceilings. This neither shrinks nor swells, there not being enough of it for the atmosphere to lay hold of. If it is desired to place such a veneer upon a wall, all holes and cracks must be filled with plaster of Paris, and being glue sized, the wall is ready for the wood in panels. The veneers are made damp with a preparation of glycerine and water which softens them, and when dried leaves them pliable. A checkerboard pattern of curled maple is about as thick as a piece of cardboard. To produce this, strips of wood are first woven in and out and then subjected to heat and pressure, which makes a smooth body, varied in hue as if it were made of two kinds of wood.

Prof. J. B. Johnson, of Washington University, St. Louis, stated that in the physical laboratory of that institution it is proposed to make exhaustive tests on the transverse strength of various timbers. It is intended to make these tests standard authority for all engineering structures and for this purpose efforts are being made to raise from $2,500 to $5,000.

TORONTO BOARD OF TRADE BUILDING COMPETITION.

WE have received from the Secretary of the Toronto Board of Trade a circular in regard to the competition which reads as follows :

The Committee, by and with the advice of their professional adviser, have decided, in accordance with suggestions or requests of competitors, to amend the conditions of competition in the following respects :

1. The party wall on the *eastern* side of the lot to be disregarded, and a new wall built entirely independent of it.

2. The point of sight indicated on the plan already furnished to be changed, and to be taken at a distance of 200 feet from the angle of the lot, near the western corner of the custom house.

3. The perspective to be set up from a *one-eighth scale* instead of from a *one-quarter scale* plan, as asked for in the conditions.

4. The Committee's professional adviser reports as follows : "It seems to me that paper 18 inches by 26, as required in the programme (not 36 as your correspondents erroneously quote it), is amply large for all these purposes. It allows a tower 200 feet high ; if a higher tower is to be shown the upper part can be drawn on a flap. Moreover, all the plans, except perhaps those of the basement and first storey, can be shown two on a sheet, if desired. I should not recommend larger paper. It is essential to the convenient handling and examination of the drawings that they shall be made on as small sheets as possible. Moreover if all the plans are on one sheet, as suggested, it is an inconvenience to the architects, as only one or two men can work on them at a time. Besides, it is a bad plan to change the conditions at this time without necessity."

OFFICE EXERCISE.

WHILE a pair of dumb-bells or clubs or some form of gymnastic apparatus is occasionally to be found in a business office they are usually provided by some one for his private use, and though doubtless efficient in promoting health and vigor as far as used, the office at large profits but little by them, and the valuable stimulus of emulation is almost wholly lost. As a rule if gymnastic exercises are permitted at all they are rather tolerated than encouraged, and for an employer to provide anything of the kind for those in his office is very rare indeed. So rare that we do not remember to have heard of it.

We are, therefore, much gratified to learn that Burnham & Root, architects, of Chicago, have set a most commendable example in this respect by fitting up a large room in their suite of offices as a sort of gymnasium. In response to an inquiry, they say : "It is used as a lavatory and exercise room, and is furnished with wardrobes Indian clubs, dumb-bells, pulling machine, foils, etc. It has a good effect on the health and spirits of our boys," and they add, "who are exceptiopally good fellows and deserve all one can do for them." We have no doubt the "boys" reciprocate the feeling, and whether Burnham & Root in fitting up this room were influenced by pure disinterested benevolence or an intelligent self-interest, or a wise combination of the two, we believe they will find it merely from a business point of view a very profitable investment.

The restless discomfort which comes from long stooping over a desk or compressing one's liver for hours on the edge of a drawing board, is apt to seek relief in skylarking or idleness, or if the conscious clerk or draughtsman still sticks to his work it is with reluctant fingers and beclouded brain, and the "output" deteriorates both in quality and quantity.

In such a case five or ten minutes' brisk use of the clubs or chest weights will accomplish more than an hour's skylarking or any amount of loafing. It has a wonderfully good effect in quickening the stagnant circulation, and a clear head and strong hand take up the work with renewed vigor.

It is surprising what a little vigorous exercise will accomplish if systematically taken. A few minutes once or twice a day, at most three times, will soon give most satisfactory results in health and efficiency.

We commend this matter of office exercise to the careful consideration of all employers of sedeotary employes, and hope the example set by our Chicago friends will be speedily and generally followed.—*Engineering and Building Record.*

THE PROPOSED CHAIR OF ARCHITECTURE.

Editor CANADIAN ARCHITECT AND BUILDER.

CANADIAN architects are pleased to be informed that it is the intention of the Minister of Education to appoint a Professor of Architecture. The reasons given are not very intelligible nor are they sufficient. That the acoustics of a hall are bad can hardly be laid to the fault of the architect, except in very rare instances. I have never heard anyone but those entirely ignorant of architecture speak as if the laws governing them were laid down on scientific principles, and could be worked to with absolute certainty. I was under the impression that beyond certain primitive rules the science of acoustics was yet in its infancy, and that it was almost impossible to determine what would be the result of certain forms and outlines in a large hall on the properties of good hearing.

However, it matters little on what ground the step toward teaching architecture is made. That it is to be taught is the main thing, and we are glad to learn it. With a better trained body of men in the profession, the really able men will have some chance of obtaining the position to which they are entitled. The general ignorance of the majority of the men who call themselves architects has done much to retard the profession and make it more difficult for the good men to do good work. The inferior men are more capable of doing work satisfactory to the average public than the better educated men, as their work being done by men nearly on the same level in art with the public is comprehensible to them ; while the work of the thoroughly educated men is to them like Greek to the public school scholar, far beyond their intelligence.

Let us hope that Mr. Ross will not hurry the architectural branch too rapidly. He will be able to gain much information on the subject if he will consult those who have more knowledge of the matter than himself. It would also be well to have some understanding with the members of the profession in this country about receiving the pupils of the school in their offices after their course. That the students of the school will require to enter an architect's office for several years to gain practical knowledge will be as much a fact as it is now. No school can turn out trained men in the profession of architecture any more than a school could turn out a competent seaman and navigator.

ARCHITECT.

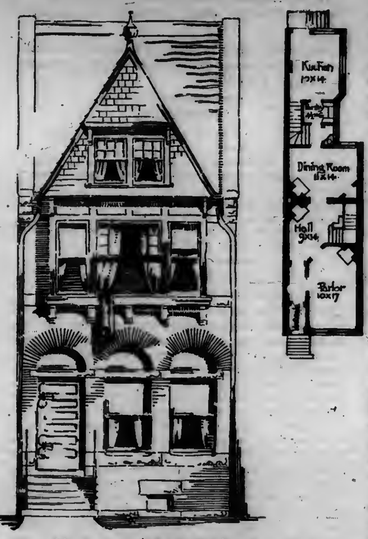
HOUSE DRAINAGE.

THE following instructive paper formed the subject of an address delivered by Mr. Phillips, of this city, to the members of the Toronto Architectural Draughtsmen's Association :

In taking up the subject of house drainage I do not intend to go into it with any degree of elaborateness from a scientific point of view, but merely to touch on its most salient points, and more especially on the construction part, and to give you some practical hints that may be useful to you in commencing your career as architects, and which will perhaps help you in your further study of the question, a question I need hardly say of the greatest importance to the architectural profession of the present day. Until recent years an architect in planning a building considered he had performed his duty to the drainage part of the plan if he put in a pipe of some shape, and usually as large possible, to carry off the water and soil from the house, and carried the pipe to a pit dug in the ground somewhere or anywhere. All he cared was to get the water and solid matter away. As to the gases, he would have laughed at any one bringing the question up. What did he know or care about the gases? But a change has taken place. An architect in the present day who does not pay special attention to the drainage part of his plan would I think be looked upon as an oddity. It behooves you therefore to make yourselves, as far as possible, thorough masters of this subject.

In planning your drainage system, four objects should be sought : 1st. All matter placed in any of the sanitary appliances in the house must be carried with the greatest possible expedition clear of the premises, leaving behind it if possible no deposits of any kind. 2nd. All sewer air must be prevented from entering the house by the channels which serve to carry away the sewerage. 3rd. As it is well nigh impossible to have house drains absolutely clean, that is devoid of all decomposing matter, all air from house drains, sink, bath, w. c. and other waste pipes, must be kept from entering the rooms. 4th. A constant current of fresh air must be established along every pipe in the drainage system, so that all gases that may be in the pipes will be rapidly diluted and carried to the outer air.

As it is not my intention, as stated before, to go into the subject too elaborately, I will take up first the pipes outside of the house ; these may be of fire clay. In your specification you should call for them to be of the best, to be thoroughly salt glazed inside and out, thoroughly sound and free from all blows or other obstruction inside. In inspecting them be particular that the salt glazing is thoroughly done over all the pipe, more especially in the inside, as it is in the inside the glazing is most required, and it is there that very often the glazing is poorest done. Moreover, the contractor will be sure to try and "bluff" you on this point. Carefully pass your hand round all the inside to see if there are any obstructions or anything that will cause sediment to deposit no matter how small it may be. See that it is thoroughly sound, and upon no account pass an unsound pipe. The contractor will likely persuade you that if he turns the crack to the top side it will not do any harm. Do not believe him, as the crack will be a vent for the sewer gas, which will travel through the disturbed ground



House at 399 Wellesley St.
Knox & Elliot, Architects.

along the course of the drain, and enter the building where the drain enters the house. If you cannot be bluffed this way, he will perhaps say that he will cement it up. Do not allow this either, but throw it out. In laying the pipes see that the bottom of the trench is cut to the run of the drain, leaving only the holes for the hubs to be cut out. The failure to do this is a great cause of unequal settling, and consequent breaking of pipes after the soil has been filled in over them. In jointing them some recommend clay joints, but I would strongly recommend you always to use cement as the clay, unless the pipes are laid in a continuously damp soil, will dry and crack, leaving numerous air holes for the escape of gas. If the trench must of necessity be filled in shortly after pipes are laid, use a quick setting, but if you can leave it open for a length of time, use a slow setting cement ; but whether you use quick or slow setting cement, do not on any account allow the pipes to be covered over until the cement is set with sufficient hardness to bear the gradual filling in of the earth. See that the hub joint is thoroughly filled up with the cement, and more especially on the underpart, as that is where the scamping will be tried. Also see that no cement is left projecting in the inside of the pipe. Have this taken away by the hand if you are using two feet American pipes, but if the three feet Scotch pipes are used, they are too long to use the arm, so the best plan is to use a small wooden disc cut to the diameter of the pipe. Do not under any consideration allow the pipes to be covered up till you have inspected every joint and satisfied yourself that each and every one is thoroughly made and tight. I have always made it a point myself when the drains are being laid to see every pipe laid, I consider this point so important. Of course you in your occasional inspection of a job cannot see every pipe laid, but you can inspect the outside of all the joints before giving your permission to have the trench filled in. In filling in see that all around the sides and bottom of the pipes are well and solidly packed with small stuff so that there will be the least possible chance of the pipes being disturbed from their position. In making a junction always use a Y pipe, never a square junction, and also let the junction be as near the upper side of main pipe as possible so that by the Y branch the flow of water from the branch to main pipe will be deflected as little as possible from a straight course, and by keeping it to the upper side of pipe there will be no chance of the branch pipe being air bound if the main pipe should be pretty well filled up with water. Where the pipe is taken through the wall into the building, see that the opening is made thoroughly good and tight so that no gas that may find its way along the course of the drain will enter the house. I have known where the pipes inside of a house were tested repeatedly for a leakage, but found to be all tight, and the smell was ultimately found to come in from the outside through the opening made in the wall for pipes to enter.

As to the size of fire clay drain pipes, a very prevalent mistake is to make them too large. I saw recently the plans of a block of stores which came out of an office in Toronto, and the main drain going into the street was figured at 9 inches. This pipe was intended to take the drainage of four water closets, four sinks, I think, and the rain water from the roof. The block consisted, I think, of five small stores, so you may judge of the roof surface. On calling the attention of the gentleman who showed me the plans to the large size of the drain pipes, he remarked : "Well, it will require it." I showed him that if these four water closets, etc., required a nine inch pipe, what a tremendous size the trunk sewer for such a city as Toronto would require to be.

Speaking of trunk sewers, let me give you the result of the difference found in experiments between the old time practice and the generally adopted present day practice. An old sewer with a superficial area of 17 feet was tested as to the rapidity of its flow, and its consequent ability to carry away all impurities and obstructions, and in a 100 feet portion of it was laid a 12 inch diameter pipe. All the water in sewer was deflected. Well, on a brick being laid in bed of sewer, no impression was made on it by the force of water, but immediately on its being laid in the 12 inch pipe the force of water whisked it away, and not only carried it through the whole length of the pipe, but a number of feet beyond, proving conclusively that the more you can compress the water, the more certainly will impurities be carried off.

But it may be said that pipes that would ordinarily be large enough to carry away drainage of buildings, will not be large enough to carry the water away say at the time of a heavy rain storm. There is a percentage of truth in this, but an exceedingly small percentage. To show this, let me give you the case of a 12 inch street pipe sewer with a large number of branch drains delivering into it, the sum of their cross sections being equal to a circle 30 feet in diameter. This 12 inch pipe on ordinary occasions ran about a third full, but during a heavy rain storm covering the whole area of ground drained by these branches, increased the bulk to only two thirds full, but increased enormously in the rapidity of its flow. An experiment was made with a 6 inch pipe 100 feet long, the upper end of which was laid in a creek with its mouth entirely covered with the water, so that the water at the commencement of its flow entirely filled the bore of the pipe. On examining the outlet of the pipe, one would fancy that as the water on entering was always keeping the pipe full, the same head of water would come out at the lower end, but instead of that it filled only 2 inches of the diameter of the pipe. Another case was that of a public building with something over 100 sinks, closets, water spouts, &c., and having a large drain 2'-6" diameter which was repeatedly examined, and its largest flow at its outlet was only equal to a sectional area of 5 inches showing that a 3 inch pipe would have been more than large enough to carry the sewage. It has been calculated that a 6 inch pipe will carry the ordinary drainage of a district with 1000 inhabitants.

Taking these facts into consideration, I would advocate that where you can have a good fall, say a half to a foot, that a four inch pipe should be used, and on no account should a larger pipe than 6 inches be used for almost any ordinary building.

Coming to the soil pipes inside a house, do not on any account have anything else but iron. They are all the better of being coated with some solution, though there is an objection to this, in that any blows that may be in the iron are very difficult to discover. Inspect all the pipes closely to see that they are sound and have the joints well made with oakum and lead. As in the fire clay drains, do not if it possibly can be avoided, use square branches. Inspect the inside of the branches to see that no ridge is there, a ridge sometimes occurring in the casting at the junction of the cones. Another point to be particular about is where a pipe is to be cut to make a short length. Do not allow a jagged edge to be used, as the consequence will be that when the oakum is put in some of it will be almost sure to get into the pipe thus, and form an obstruction. At the junction of lead and iron pipes I would advise you to use copper flanges, as brass is more liable to corrosive action than copper.

ARCHITECTURAL GUILD.

THE Architectural Guild held its monthly meeting at Long Branch on Thursday afternoon, the 9th of August. There was a very good attendance and the afternoon was spent in a very pleasant and profitable manner.

ARCHITECTURAL EDUCATION IN THE STATES.

UNDER the above heading the *American Architect* has a lengthy article on the architectural instruction given in the Massachusetts Institute of Technology. As it is the expressed purpose of the Minister of Education for Ontario to establish a Chair of Architecture in Toronto shortly, the course of study prescribed in the Massachusetts Institute published herewith will be of interest to those who may intend to study architecture in our own country. The regular course, as we mentioned last month, extends over four years, but a special course of two years has been planned for students who cannot devote the longer period to this branch of study. The special course is as follows:

FIRST YEAR.

FIRST TERM.	SECOND TERM.
The Orders and Elements of Architecture.	Original Design.
Sketching and Water-Coloring	Sketching and Water-Coloring
Mechanical and Free-Hand Drawing.	Mechanical and Free-Hand Drawing.
Materials.	Shades, Shadows, and Perspective.
Elementary Mechanics.	Common Construction.
Architectural History.	Graphical Statics.
	Architectural History.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Original Design.	Original Design.
Sketching and Water-Coloring	Sketching and Water-Coloring
Specifications.	Specifications and Contracts.
History of Ornament.	History of Ornament.
Problems in Construction.	Planning.
Ventilation and Heating.	Iron construction.
Working-Drawings and Framing.	Schools, Theatres, Churches.
	Ventilation and Heating
	Surveying.
	Stereotomy.
	Problems in Construction.

The regular course is the same for all departments of the Institute during the first year, and is confined to general studies, with the single exception of a large amount of mechanical and free-hand drawing. No one is allowed to continue in the department who does not have credits in mechanical drawing, including geometrical drawing, shades and shadows and descriptive geometry.

The regular course is as follows:

FIRST YEAR.

FIRST TERM.	SECOND TERM.
Algebra.	Algebra.
Solid Geometry.	Plane Trigonometry.
General Chemistry.	General Chemistry.
Chemical Laboratory.	Chemical Laboratory.
History of the English Language.	Political history since 1815.
English Composition.	French (or German).
French (or German).	Mechanical and Free-Hand Drawing.
Mechanical and Free-Hand Drawing.	Military Drill.
Military Drill.	

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Materials.	Original Design.
Architectural History.	Common Constructions.
Drawing.	Architectural History.
The Orders and Elements of Architecture.	Shades, Shadows and Perspective.
Analytic Geometry.	Sketching.
Physics.	Differential Calculus
Descriptive Geometry.	Physics.
Political Economy.	English Rose.
German.	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Original Design.	Original Design.
Sketching and Water-Coloring	Sketching and Water-Coloring
Working Drawings and Framing.	Iron Construction.
Lecture on Fine Art.	Kinematics and Dynamics.
Integral Calculus.	Strength of Materials.
German Statics.	Stereotomy.
Structural Geology.	Physical Laboratory.
Physics: Lecture and Laboratory.	European History.
German.	German.
	Acoustics.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Advanced Original Design.	Advanced Original Design.
History of Ornament.	Sketching and Water-Coloring
Sketching and Water-Coloring	Planning.
Problems in Construction.	Schools, theatres and churches.
Specifications.	Problems in Construction.
Strength of Materials.	Specifications and Contracts.
Lecture on Fine Art.	Constitutional History.
Heating and Ventilation.	Heating and Ventilation.
Advanced French.	Advanced French.
	Thesis Work.

The two-year special course thus includes the mechanical and free-hand drawing of the first year of the regular course, the drawing and design of the regular second and third years, and the more strictly professional lectures of the second, third and fourth years, with a practical course of its own in trigonometry and graphical statics, without the higher mathematics, which are pursued quite extensively during the four years' course.

OUR ILLUSTRATIONS.

CHURCH AT ALMONTE, ONT.

STORE FRONTS FOR MESSRS. JOSEPH MCCAUSLAND & SON, TORONTO—DARLING & CURRY, ARCHITECTS.

DETAIL FOR VERANDAH.

HOUSE AT 399 WELLESLEY STREET, TORONTO.—KNOX & ELLIOTT, ARCHITECTS.

W. T. Whitepay, architect, late of Vancouver, B. C., has moved to San Diego, California, and opened an office.

Mr. James Wright, architect, of Montreal, has taken a partner in the person of Mr. Findlay. The firm name is now Wright & Findlay.

PERSONAL.

Mr. C. Schreiber, Chief Engineer of Government railways, is at present on the Pacific Coast.

Mr. Gobeil, secretary of the Public Works Department, has returned to Ottawa from the Isle of Orleans, where he spent some weeks recruiting his health.

It is rumoured that Mr. Collingwood Schreiber, Chief Engineer of Government Railways, will shortly resign his position, and that Mr. Walter Shanly, M. P., will be asked to become his successor. It is not considered probable that Mr. Shanly will accept.

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

SINCE my last report, I regret to have to say that building prospects in Hamilton have not improved. There have been no contracts let for the number of private residences that were in contemplation in the spring, and very few tenement buildings have been erected this year—so different to previous years when whole blocks were built by those enterprising contractors, the Patterson Bros., of this city. In fact it is understood that they don't intend building any more for instalment speculation, as a number of dwelling houses built by them in this place remain undisposed of, and to let; in fact, they have concluded that the procedure did not pay. It is quite apparent that the bad result of the strikes is having its effect, and there is little or no work for the building trades, who will have to face a long winter after a comparatively idle summer, and without the usual provision being made for the time when there is never work to do. I understand that the same state of things exists in Toronto and elsewhere. One would think that the unions would seriously consider the position, and change their programme.

The work on our new City Hall is progressing favorably now that the stone, which is brought from Nova Scotia, is coming to hand, and a number of stonecutters and masons have steady employment on the job. The contractor, Mr. Pigott, deserves great credit for his indomitable energy and perseverance, having had to contend with the most determined opposition of the labor unions, who made every effort to prevent the work from being carried on in opposition to their absurd regulations.

I am glad to see that the action of the Provincial Government in engaging a foreign architect to prepare plans for the new Parliament Buildings in preference to Canadian talent, is being condemned, and as the adopted designs are inferior to those prepared by the Toronto architects, and will cost vastly more for the building, there must be a very unpleasant reflection for the responsible parties. But when Canadian architects become incorporated and united as a body they will not be treated thus unfairly.

I am glad to say that our Building Inspector's book is ordered to be accurately kept in future, proper entries being made by the proprietors or their architects, so that hereafter I can forward you a correct statement of all new buildings to be erected in Hamilton.

The strength of fire-clay as a building material says one who ought to know can hardly be estimated. Recently a piece of beam filling, containing about three square feet, designed simply to be used as a ceiling and not intended to carry the weight of the floor above, was placed on supports and loaded with a weight of 5,000 pounds, which it carried without any sign of giving. That was about 1666 pounds to the square foot, and the strongest floors now made are only designed to carry about 300 pounds to the foot. I didn't see the use of making the test, as the article in question carried no weight but its own, but the architect made it and the clay stood it. Fire-clay is now subjected to a heat of 2000° in baking, is said to be a greater heat than is raised in the blast furnaces in which it is placed to reduce ore. The uses to which fire-clay brick, tiling and tubing are being put in modern fireproof buildings are now almost innumerable, and the end is not yet.

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

PROPORTIONS OF THE PARTS OF THE STAIRS.

THE breadth of the steps of common stairs is from 9 to 12 inches in the best staircases in private and public buildings. In such buildings the breadth ought never to be less than 12 inches nor more than 15 inches.

A step of greater breadth requires less height than those of less breadth. The first person who attempted to fix the relation between the height of the riser and width of the steps was Mons. Blondel, in his "Cours d'Architecture," if a person walking on a level plane over P space, at each step and the height which the same person could ascend vertically at one step, with equal ease was H; then, if h be the height of the step, and p the width, the relation between p and h must be such that when $p=P$, $h=0$, and when $h=H$, we must have $p=0$.

The conditions are satisfied by an equation of this form;

$$h = H\left(1 - \frac{p}{P}\right)$$

Blondel assumes 24 inches for P, or the step a person can make with ease on a level plane 12 inches for H, or the height a vertical step can be made with equal ease; and putting these numbers for P and H, in our equation, it becomes $h = \frac{1}{2}(24 - p$, which is precisely Blondel's rule. We do not think that the rise, which is equal to a level step of 24 inches is more than 12 inches, but it would be difficult to ascertain the ratio exactly, and the above are so near and agree so well with our observations on stairs of easy ascent, when the breadth of tread includes the nosing, that they may be taken from the elements of a practical rule.

Hence, according as the tread p, or the rise h, is given we have

$$h = \frac{24 - P}{2}; \text{ or } p = 24 - 2h.$$

Thus, if the height of a step be 6 inches, then $p=12$, and $\frac{24-12}{2}=6$, the rise for a step that has a tread of 12 inches, including the nosing, ought not to exceed an inch, we have these general rules:

TO FIND THE PROPER RISE FOR THE STEPS WHEN THE TREAD IS GIVEN.

From 24 take 1=23; from the remainder, 23, substract the breadth of the tread in inches, and half the difference will be the rise.

Thus, if the tread be 12 inches, then

23
12
—
2)11
—
5½ inches, the tread required.

TO FIND THE PROPER TREAD WHEN THE RISE FOR A STEP IS GIVEN.

Subtract twice the rise from 23 and the remainder will be the proper width of the tead.

Thus, if the rise be 5 inches,

23
6 × 5=10
—
13 inches, the tread required.

Again, if the rise be 7 inches, then

23
2X7=14
—
9 inches, the tread for a step with a rise of 7 inches.

Before we set out the stairs in a building we must consider the height of the story and determine upon the height or rise of the steps, which being done we must take the height of the story in inches and divide the number of inches in the height of the story by the least rise proposed for a step; if the result be fractional, divide the height of the story by the number, neglecting the fraction, and the result will be the exact number of steps. For example, if the height of a story is to be 10 feet 4 inches, and the height of a step is to be not less than 7 inches, how many steps will be required in order to ascend to the given height?

Here (10 feet 4 inches) X 12—124 inches.

Now $\frac{124}{7}$=17 5-7, which neglecting the fraction, is the number of steps required; and $\frac{124}{17}$=7 5-17 inches, the height of the rise.

But if there be no winders in the stairs, an even number of steps will be more convenient than an odd number. Therefore either 18 or 16 may be adopted; if we must have 16, $\frac{124}{16}$=7¾ inches, which may answer very well; but if we are still confined for room on the plan we must have recourse to winders.

The breadth of a staircase may be from 5 to 20 feet, according to the destination of the building; but if the steps be less than 2 feet 4 inches in length, they become inconvenient for the passing of furniture, and such narrow stairs should be avoided, even in small houses.

When the height of a story is very considerable, resting places become necessary. In very high stories that admit a sufficient

head room, and where the plan or area for the stairs is confined, the stairs may make two revolutions in the height of the story—that is, in ascending or descending we may go twice round the newel or well hole; and this becomes necessary, otherwise the steps would be enormously high, or extravagant floor-room must be allowed for the stairs.

As grand and principal staircases require broad and low steps, they therefore require to be numerous, and admit of only one revolution in the height of the story, the plan being always proportioned to the height of the buildings.

It may not be amiss to give an example here for a principal building, in order to show the number of steps both in the grand and in the common staircase.

For this purpose, suppose the story of a house to be 16 feet high from floor to floor, the height of the steps of the servants' staircase to be not less than 7 inches, and that of the grand staircase to be not more than 6 inches.

Now the height of the story reduced to inches is 192, and first dividing by 7, thus:

$$\frac{7(192}{27\frac{1}{4}} \quad \text{Therefore,} \quad \frac{192}{27\frac{1}{4}} = 7\ 1\text{-}9 \text{ rise.}$$

Then, for the principal stairs, dividing by 6, thus:

$$\frac{6)192}{32} \text{ steps, } @ \text{ 6 inches the rise.}$$

So that the servants' stairs require 37 steps and the grand staircase 32; but the space or area required to execute the common stairs must therefore have two revolutions in the height.

This being allowed, will reduce the area to half of what it otherwise would have required.

We must, however, observe that when the height of the story is less than 14 feet the stairs will not admit of two revolutions.

In planning a large edifice particular attention must be paid to the situation of the stairs, so as to give the most convenient and easy access to the several rooms.

With regard to the lighting of a grand staircase, a lantern-light or a sky-light with a horizontal light under it is the most appropriate.

By introducing these more effect is produced and the light admitted is more powerful, but, indeed, where one side of the stair-case is not a portion of the exterior wall a lantern or skylight is the only way in which the light can be admitted.

In stairs constructed of stone the steps are made of single blocks; quarter-spaces and half-spaces are, however, often made in two or more pieces and joggled together; but when the material is wood, the risers and treads must be made of boards, which are fastened together with glue, brackets and screws; and these, though done with the utmost care, can never be made so firm as not to yield a little to the passenger.

To prevent the stairs from becoming rickety, in length of time, the steps must have an additional support under them, and, that the appearance may be both light and pleasant, the whole must be confined to as small a space as possible.

This additional woodwork, which is necessary to the firmness and durability of the construction, is called the *carriage of the stair.*

The carriage of the stair usually consists of several pieces framed together, and each flight of steps is generally supported by two pieces of timber, placed under the steps, and parallel to the wall, being fastened at one or both ends to pieces perpendicular to the walls.

The pieces of timber which are thus placed under the steps are called *rough strings.*

The subject of hand railing is too intricate and would require more space than is allotted to us to discuss it here.

NOTE.—A portion of the notes on the proportions on the steps and risers are the substance of that given by an anonymous writer in a English work on carpentry and joinery.—D. W. King, in *Building.*

BOWMANVILLE.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

THE private tender of Messrs. Munson & Bunney for the rebuilding of the Congregational church and vestry has been accepted by the building committee. Before its recent destruction by fire this was one of the finest churches of its size in the Dominion, and a view of the plans which have been prepared by Mr. Bunney warrants the opinion that it will undoubtedly retain its reputation. The church is to be finished and ready for occupation by January next.

Our School Board has not decided on any plans yet. During the year there has been nothing but wrangling over them, and two or three architects have been discharged. Messrs. Power & Son, architects, of Kingston, are now engaged preparing plans, and it is hoped the Board will adopt them and proceed at once to erect the building.

WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE building trade in Winnipeg has not been very brisk this season, but the prospects are very encouraging. There are a few small private residences being erected, but except the Herdler block which is now almost completed, there have not been any business blocks built this year. Bricklayers and masons have very little to do.

Painters and plumbers are busy. Carpenters are well employed, there being several working outside the city on the stations for the Red River Valley railroad, and also on several elevators that Messrs. Timewell & Son are architects for. C. F. Stevens, is erecting a fine residence in Fort Rouge. Mr. Wheeler is the architect.

Messrs. O'Connor & Brown, proprietors of the Queen's hotel, are advertising for tenders for alterations and improvements.

The Winnipeg waterworks are putting down several miles of water service and the city is adding to its drainage system. Mr. Doidge, contractor, has about nished his block pavement contract.

The new buildings for the General Hospital are nearly finished.

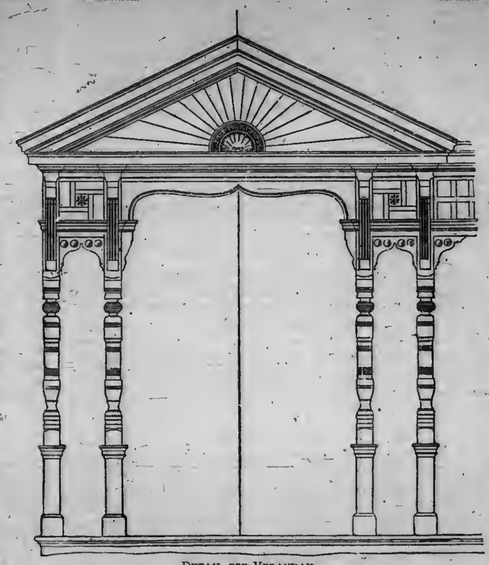
OTTAWA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

BUILDING operations here have been much brisker this summer than for the past ten years. A large number of private residences, schools, churches and business blocks are being erected. It is estimated that the building operations for the present season will amount to $300,000.

The competitive designs, under motto, for the new police station for which $55,000 has been voted, have been before the Property Committee of the City Council for the past three weeks, but up to the present time they have not been able to decide upon the most appropriate plan. Four designs were sent in, and although under motto, one of the competitors signed his specification, and in place of ruling him out for irregularities, his plan is still before the committee. This is one of the beauties of competitions.

The want of an architectural association is seriously felt here. An effort has been made at different times to form an architects' guild in this city, but the trouble appears to be to define who ar qualified to become members. It is to be hoped that through the CANADIAN ARCHITECT AND BUILDER the architects of the different cities and towns will give their views on the necessity of a national association, and that during the coming winter a meeting of architects may be called and an effort made to form an association.



DETAIL FOR VERANDAH.

The contract for the new Roman Catholic church for this city has been awarded to O. J. Lyons for $74,500. It is expected that the foundations will be laid this fall, and the work completed in two years.

For seventy yards of surface provide 1,000 pieces of lath, and eleven pounds of lath nails.

For 100 square feet of roof, 1,000 shingles, laid four inches to the weather, and five pounds of shingle-nails, will be necessary.

Mr. Sylvester J. Campbell, builder and contractor, Galt, Ont., has disappeared, leaving a large number of sorrowing creditors.

Mr. John Purdon has been given the contract to build an additional wing to the asylum at London, Ont., at a cost of $20,000.

Messrs. Harding & Leathorn, of London are laying the new waterworks mains of Goderich. There will be 35,000 feet all told and 47 hydrants.

In estimating amounts of siding and flooring, allow one-fifth more than the surfaces to be covered for the lap in siding and the matching in the flooring.

The contract for the construction of a new water-works system at Brantford has been given to the Waterous Company, of that city at the price of $106,278.

There are in Canada 84 loan and building societies, of which 66 have their headquarters in Ontario. The subscribed capital of the Ontario companies amounts to $72,878,215.

A Brantford paper makes the statement that the members of the London School Board have had their portraits carved in stone and placed over the windows in a new building, and are now quarreling with the artist because he didn't make them appear better looking.

For some time past builders in Germany have resorted to the use of a composition of cork, sand and lime, molded into bricks, for the construction of light partition walls. This is said to exclude sound better than ordinary brickwork, while being light and a good non-conductor of heat and cold.

We learn from the Victoria, B. C., papers that building operations are very brisk in that city at present. Architects have never been so busy before, the brick and lumber yards have all they can do to supply the demand for materials, and carpenters and bricklayers are fully employed. Over half a million dollars worth of new buildings are in course of erection.

The Canadian correspondent of the *Liverpool Journal of Commerce* says that "in all parts of Nova Scotia there is great activity in building, and there is scarcely a town or village that does not show material improvement. A considerable number of Nova Scotians have recently returned from the United States with a large stock of experience, which they intend to utilize for the benefit of themselves and their own country.

A brick dwelling with a shingle roof is estimated to last 75 years, and depreciates 1½ per cent. per year. The plastering therein 20 years, 3½ per cent.; painting, 7 years, 14 per cent.; shingles and outside blinds, 6 per cent.; cornice and base, 48 years, 2½ per cent.; sheathing, 50 years, 2 per cent.; flooring, 20 years, 5 per cent.; doors, windows inside blinds, stairs and newel, 30 years, 3½ per cent.; building hardware, 20 years, 6 per cent.; sills and floor joists, 40 years, 2½ per cent.; dimension lumber, 75 years, 1½ per cent.

Captain Shaw, Chief of the London Fire Brigade, in a magazine article on the protection of dwelling houses from fire, says: "there is a great deal of faulty construction in houses in consequence of architects being seldom employed. Cracked walls are almost sure to give way in case of fire. 'Party' walls should be carried at least three feet above the highest part of the roof. All roofs should be provided with windows or openings by which the inmates of a house could escape in the event of the stairs becoming impassable. The best material for stairs is wrought iron and the worst stone, since the latter yields to an amount of heat which does not affect ordinary respiration. Whenever a house has both wooden and stone stairs the inmates should, in case of fire invariably make for the wooden stairs, as affording the only hope to escape.

'In joinery, as in all systems of construction, says Violiet-le-Duc, the material used must regulate the mode of joining and determine the form, wood being a material possessing special properties, that must be considered in arranging works in joinery as well as those in carpentry; mediæval artisans never abandoned this correct principle. A knowledge of wood is one of the conditions required of the joiner, after acquiring with its texture and strength. The best wood for joinery is oak, on account of its stiffness, the delicacy of its fibres, its uniform, hardness, its durability and its beauty. Hence, at least in France during the middle ages, oak was exclusively employed in the joinery of buildings.

The subject of masonwork in freezing weather continues to occupy a good deal of attention in the technical journals. The stories of the excellence of stonework laid with hot mortar in Stockholm and other Northern cities in winter, and then allowed to freeze, have multiplied, while, on the other hand, a recent report by an American engineer, Mr. Emil Kuichling, appears to show conclusively that mortar, particularly if made with cement, and used hot, lost a large part of its strength; the resistance, as determined by actual experiment, of briquettes of neat cement, mixed hot and then exposed for seven days to the air, being, on an average, only one-eighth that of briquettes of the same cement, mixed at the same time, with water having the temperature of the air, and then exposed in the same way. Curiously enough, briquettes made with Portland cement and cold water would not freeze, even at a temperature of thirteen degrees Fahrenheit, unless exposed to the wind, and the setting process appeared to go on undisturbed even at this temperature; while briquettes made of the same cement, mixed with hot water, invariably froze. With natural cements the resistance to freezing was much less than with the Portland, but no details are mentioned on the subject. The addition of salt to water, sometimes made to prevent freezing, is found to injure native cements, while Portland is not affected.—*American Architect and Building News.*

[ADVERTISEMENT.]

"The pleasing effects attainable by the use of mortar stains has led to their widespread adoption by the architects and builders, especially in the beautiful suburban towns adjacent to large cities, where the demand for them is steadily upon the increase. The character of the coloring matter used is of course an important consideration, and as results are not always immediately manifest, too much care cannot be exercised in their selection.

Competitive tests of the different brands all point to the "Pecora Mortar Strains" as the most desirable, especially in the thoroughness of its coloring qualities, permanency and absolute imperviousness to atmospheric changes.

Neither heat, cold or dampness will cause it to run or bleach, and in no respect does it alter the condition of the mortar, quicken the set, or induce it to crumble.

No more haste therefore is necessary in striking the joints than with ordinary white.

Careful analysis also proves its freedom from all substances injurious to the workman, and likewise demonstrates the absence of gas, oil and all impurities which tend to hinder the process of hardening. It is incapable of change and therefore cannot possibly increase the white deposit common to brick fronts and being reduced to a smooth paste it assimilates readily with the mortar while we have the testimony of competent experts tha these stains will color one-third more mortar than any in use.

These goods are being made by S. Bowen's Sons, 150 North 4th street, Philadelphia, U. S. A. Canadian dealers can be supplied by M. & J. L. Vokes, Toronto, who are the agents for Canada.

INTERIOR DECORATION.

THE iostances in which rooms are painted in oil or distemper mainly free hand with elaborate ornaments, says the *Painters' Magazine*, is increasing. The difference between the undeviating regularity of pounced figures and those executed otherwise is apparent. Free hand treatment may, of course, be advantageously combined with the use of the stencil, particularly where scrolls form part of the design, as scrolls demand exact repetition of form.

A somewhat elaborately painted apartment, the scheme being very felicitous, has the wall space in distemper; the tone or tint of color, which is neutral and of a slightly green hue, is made from lime blue and raw umber mixed with white, the umber being of a golden tint. The color of this wall space is fitted to contrast well with engravings, water colors or oil paintings, as well as with the warm colors presented in the room. The wall is paneled, the stiles being painted in a slightly darker shade of the same color with a touch of Indian red added. This with the perpendicular lines gives sufficient distinction to make the stiles appear of an entirely different color without being too strong. The dado is painted with a darker tone of color made with raw umber, Brunswick green, Indian red and white in oil colors. Had the dado been in distemper, lime blue instead of green would have been best introduced into the mixture. The corners of the panels are stenciled with dark brown made from umber, Indian red and black, and the pattern on the panels in a slightly lighter shade of the same color as the panels themselves, sufficiently strong to show the pattern clearly. The lines round panels are done with a strong dark, dull gold color made with ochre and umber alone. The skirting is done with the same color as the corners of the pattern are stenciled with. Underneath the frieze is a picture moulding painted black. The whole of the breadth of frieze is painted the same color as the wall space, but with a little ochre and Indian red added; the figures are leafage in gold lines bordered with fine black lines.

She parlor of a house recently finished has the wall space between skirting and frieze painted without ornament in lavender of a delicate shade. The frieze is a light buff with leaf design in gilt, veins being outlined in dark brown; a broad line of guilt runs below. The moulded cornice is a lavender tint with upper section a soft light shade of sea green with light blue edge, the moulding picked out with gilt. The grounding of outer stiling of ceiling is of great breadth, painted in with a beautiful shade of lavender bordered by light blue lines and is studded with medallions on a ground of black that presents a beautiful combination of brilliant colors so selected and toned as to have a rich subdued effect. The inner edging has border in leaf on a delicate blue ground in gilt and cherry red. As each end of the ceiling, which is of oblong shape, is a large medallion in bronze colors, the figures constituting a vase with flowers and foliage, griffins forming the handles. The stucco centre piece shows gilt, sea green and soft pink beneath the open work, the projecting portions showing a brilliant combination of colors, harmonized and pleasantly contrasted.

The dining room, as well as the library, has always provided suggestive symbolical designs for painters and decorators. The pursuit of game, the netting of fish, the husbandman's labors, the vintage and the orchard have formed the subjects of friezes, sometimes in processional form, and are occasionally now introduced, but general taste would seem to incline against these too direct allusions to the purposes of the room. We have met in the free-hand decoration of a sleeping room a symbol as an ornament for the walls eminently appropriate, namely, the poppy, the emblem of sleep. The flower itself is well suited for ornament, particularly, as in this case, with a varied disposition of leaves and stalks. The design is admirably treated in blue and red on an ecru ground. Although there are no blue poppies the use of other colors than the natural ones is conventionally correct. The frieze is of sulphur yellow with gilt, and the ceiling, there being no cornice, is of a light bluish tone, with border consisting of band of series of narrow lines in red.

We lately saw a hall the chief wall space of which was a pale old red, the matting dado also red but of deeper tone; the frieze too was red with an all-over interlacing pattern in paler gold red, outlined heavily with red gold; the ceiling was a warm drab with red gold and pale red interlacing pattern over it, the drab by the contrast giving a distance effect. The hall floor was painted in an antique red color, and had a central Smyrna rug in old reds and ecrus with touches of olive and dull blue. Two portieres, one at the entrance of the staircase hall and the other of the library, were of Indian red cotton canvas. The abundance of red was not displeasing.

A north room with antique oak has a wall paper in two shades of light shrimp of toliage pattern with a frieze of light olive green of the same style paper, separate from each other by an oak picture rail; the ceiling is a lighter shrimp pink ground with golden olive figures.

The best time to paint the outside of a house is early in the winter, or in the spring, when the air is cold and no dust is flying.

The first, second and third coats of paint, on the outsides of buildings, should be prepared by mixing the white lead with boiled linseed oil, and allowing each coat to dry hard before applying the next.

A firm in Brooklyn is manufacturing a species of metallic relief for wall decoration, consisting of thin sheets of tin, brass, copper, steel, aluminum or other metal embossed in beautiful patterns, which are simply decorated in colors and nailed on wall or ceiling.

Parts of wood to be painted which are soiled by smoke or grease are to be washed with a solution of saltpetre in water, or with very thin lime whitewash. If soap-suds are used to wash off the smoke or grease, they should be thoroughly rinsed with clean water or the paint will not harden.

White or plain ceilings no longer make even a pretence of existing. To paper the ceiling is as absolutely necessary as to conceal the white monotony of the wall. Papers with harmonizing accessories, as stilings, extensions, corners and centres, etc., are now made expressly for the appropriate aspect of the ceiling. The sides once settled in character the ceiling arrangement will follow with competent choice, without difficulty or dilemma. The color, tone and harmony of the ceiling establishes the art and beauty temperament of the entire room—just as sunshine or shadow supplies the comfort or cheerlessness of the day.

We learn from the *Builder and Wood Worker* that Lee Yoing, a skillful Chinese carpenter and joiner, has arrived from San Francisco to take charge of the interior beautifying of the new Chinese town hall, at No. 16 Mott street, New York, which is now in process of erection. Lee is said to be the most skillful woodworker in the United States. He can build a box, a table or an entire house without the use of a nail, and can carve any figures on wood as easily as a Chinaman writes firecracker letters. His stock of tools is a curiosity shop to the ordinary American eye. They are of all sizes and shapes, and mostly of roughly wrought iron or steel.

Frequently it is found undesirable to paint stone trimmings of a house which have been discolored; or a stone basement of a wood or brick house may be in the same condition. Monsieur Diebhabert, of Paris, has adopted successfully the method of cleaning the stone on the walls of the quays of the Seine where it flows through that city. To a paste composed of a solntion of soda and lime is added a little chloride of lime; this is mixed to the consistency of honey and spread over the surface and allowed to remain two or three hours. After this treatment a mixture called sulpho-chlorhydric is passed over the surface with a large gutta percha brush, which forms a kind of glue on the stone; afterwards the surface is syringed with the same liquid. This forms an adherent paste, which is afterwards scrubbed off. The sulpho-chlorhydric mixture is composed of sulphuric and hydrochloric acids mixed empyrically according to the necessities of the case. The most besmirched stone regains under this treatment its pristine appearance. It often happens that discolored stonework detracts from the effect of the painter's work on the rest of the facade; sometimes the stone is begrimed with a slimp deposit which resists the application of a color coating.

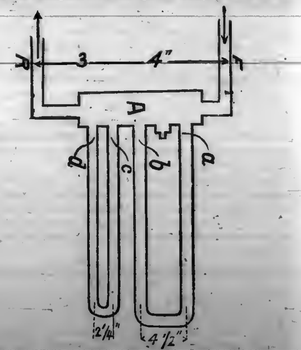
The moths have taken wildly to the electric light, and, in fact, love it not wisely but too well, says a Brantford paper. Every morning the linemen throw out thousands of these insects from the globes where they have been attracted by the light and killed by the current. Lineman Harvey Tombinson has selected the most perfect and rarest specimens on his usual morning round, and has now got one of the most complete collections of Canadian moths in the city.

HOT WATER HEATING.

THE motive power gravity which causes circulation in a hot water heating plant is brought into action not by the expansion of the water, but by its contraction. To make this clear, says a writer in the *Northwestern Architect*, consider that the normal condition of the plant when in operation is with the hottest water in the place and that what takes place in the actual starting of the apparatus is a *changing condition*. Let us then imagine the apparatus to be filled with hot water and just enough fire to keep the temperature at the top of the boiler constant to be maintained.

In the marginal sketch B represents the boiler, R, a radiator, C a coil, T a tank, F, a flow or supply pipe and d d return pipes. On account of the greater amount of surface exposed, the water in the pipes d d, soon becomes colder than that in F and contracts, the loss in bulk is "made good," from the tank, and consequently the water in d d is heavier than an equal horizontal section of water in F and B and falls down forcing up an equal bulk not equal weight of warmer water. This would be the case even if d d entered the top instead of the bottom of the boiler and if the surfaces exposed were exactly equal it would be impossible to make all other conditions approach equality near enough to maintain a perfect balance and prevent a circulation up one pipe and down another. A single pipe standing up will have a slight circulation up the centre and down the outside so long as the water in the boiler is hotter than that in the pipe.

It should be constantly borne in mind that more motive power in a hot water plant is only to be obtained by an increase of the difference in the temperature of the supply and return pipes and that the increase will either lower the average temperature of the radiators thereby decreasing the amount of heat obtained from them, or will raise the temperature of the boiler and lessen its efficiency by which we mean the ratio between the heat theoretically obtainable from a given quantity of fuel and that actually obtained. Therefore we should look well to the resistances to be overcome and see that the piping is so arranged as to make as little as possible. This end is best obtained by directness, using but few fittings and especially avoiding elbows. Those in common use have been shortened by competitive manufactures until many of them are on a radius of less than one diameter. Longer ones can be procured but so few of them are used that no dealer carries any stock of them and the price is so high that it is probably cheaper to use pipe of such size



that the use of common ones is admissible than it is to buy long ones. Any fitting even a coupling is an obstruction as the flow is diminished by the discharge into it and the entrance into the pipe on the other side of it, these losses can be reduced by reaming the pipe to semblance of the "Vena contracta" but it is difficult to get fitters to do it. As a general thing they either think

it a "useless refinement" or forget it. To give some idea of the relation between the resistances and the difference of temperature necessary to overcome them the following experiment is reported, it was, however, made for another purpose.

A represents a one inch branch tee with one and one-fourth inch inlet and outlet, distance from center to center of branches two and one-fourth inches, the one inch pipes were three feet long the two upper ones connected at their ends with two elbows and a nipple the two lower ones with a return bend. The pipes F and R are the flow and return pipes one and a half inch to the elbows which were directly connected to the upper and lower drums of the Walker Pratt boiler. Thermometers were inserted at a, b, c and d, and in a pipe connecting the front end of the drums to give the temperature in the boiler. The temperature of the room was 74 degrees at boiler 183 degrees.

$a = 180°$, $b = 173\frac{1}{4}°$ } loss $6\frac{1}{4}°$

$c = 180$, $d = 172$ } loss $8°$

The difference between "a" and the boiler was in part caused hy the obstruction of two and one and one-half inch globe valves which are not fit for any use whatever on a heating plant and should never be put on good work, they were used in this case because they were on and the boiler filled and fired when it was determined to make the experiment, of course the "head" in the case of the one inch pipes is small being only that due to the contraction of a column two and one-fourth inches high cooled four degrees in one case and one four and a half inches high cooled three and a fourth degree in the other. If we assume that the losses of heat in the upper and lower circuits are equal it follows that the quantity of water flowing through them varies inversely as the losses in temperature or as sixteen to thirteen. The efiective head in each circuit is practically proportional to the height multiplied by the loss in temperature or as twenty-six to sixteen, the velocities are as the square root of the heads and the sections being the same the flows are in the same proportion, this gives a theoretical proportion of fifty-one to forty. The circulation through the body of the branch tee with the head due to the contraction of a column three feet and four inches high was so rapid that the slow stream of water of $173\frac{1}{4}$ degrees temperature flowing in at "b" produced no appreciable effect on the thermometer at "c" although it must have made some difference. The thermometers used were only graduated to degrees and were read to half degrees with difficulty. There are many variations in the manner of "piping" houses. The manufacturers of "heaters" all show in their catalogues a large number of small pipes leading from the top and returning to the bottom of the heater and advise their customers to do their work in this way. It is not considered the best way by men of large experience however. It is quite probable that the manufacturers take this course because it requires less skill and judgment to make a plant work this way than it does to proportion the pipes for a "branch" system, and they sell their goods to many dealers who are not experienced in the business. It is more expensive in pipe as a role and makes the cellar hotter to have many small pipes than to have one large one. The carrying capacity of pipe having considerable length increases as the square root of the fifth power of their diameter. Their radiating surface practically as their diameter and the price somewhat faster but nothing near to their capacity ratio.

Moncton, N. B., will discard gas in favor of the electric light.

Mr. Peter English is negotiating for the sale of the Galt gas works.

The city of London wants a competent assistant water works engineer.

The City Engineer of Halifax, N. S., has recommended the City Council to discourage the use of hopper water closets.

The Brantford, Ont., Electric Light Company have put in a new thirty-five lamp machine which enables them to supply ninety-five lights in the city.

The secretary of the Provincial Board of Health, Dr. P. H. Bryce, states that the Province of Ontario is at present freer from contagious diseases than it has been for years past.

The drainage of buildings requires to be carefully looked after in the interests of the health of the occupants. A serious attack of typhoid fever was the result of a stoppage of a drain connected with the Carmelite Convent, Montreal.

L. Pasteur, the celebrated French physician has expressed the opinion that the proposed Victoria hospital at Montreal may be erected at a distance of 230 metres from the city reservoir without danger of contamination of the water supply.

The Stratford, Ont., Gas Co. are putting in what is claimed to be the largest gas engine on this continent as an auxiliary to the water wheel in their electric light station. Ordinary illuminating gas is used as fuel.

It has been estimated that a modern brick dwelling of medium size requires about 10,000 gallons of water in its construction, much of which is still present when the workmen withdraw. Heat is of less use in getting rid of this moisture than free ventilation.

Mr. Kirk, plumbing inspector, Toronto, makes the suggestion in the columns of a couple of our American centemporaries that the plumbing inspectors should form an association and meet annually to discuss matters of interest. The suggestion appears to have been favorably received, and will douhtless bear fruit.

The New York board of health will endeavor to deodorize the foul earth thrown up in digging trenches for gas and water-pipes hy using bromine. A few years ago says the *Sanitary News*, the health officer of Detroit, Dr. O. W. Wight, determined to try the effect of disinfecting the sewers during an epidemic of scarlet fever and diphtheria. Seventy-five thousand pounds of dissolved copperas were poured into the sewers. Three tons roll sulphur were burned in iron pails and lowered in the sewers and the sulphur smoke and sulphurous acid gas filled every drain and sewer pipe. The result was a great abatement of diphtheria and an almost entire cessation of scarlet fever. It is believed bromine will disinfect sewers quite as effectually and much more pleasantly.

Factory owners at Carlisle, says an English paper, have made no objection to the utilization of the tall chimneys as ventilators for the sewer of the town. Already twenty-nine are in operation. From experiments made it was found the amount of air passing up the chimney was 16,596 cubic feet, and the velocity was 1,202 lineal feet per minute, or more than a mile in five minutes. On windy days the motion would be quicker. The difference between the air of the sewers and atmospheric air is suggested when it is said that the latter has occasionally three times the velocity of the former—or, in other words, the air from sewers is heavy. No harm can arise to the workers in the factories from the extra employment of the chimneys, and such powerful ventilators must remove the danger attending sewers.

Mr. Allen Pringle in a letter to a Toronto daily paper on the subject of impure water, urges as the best preventative of sickness from this cause, the use of water filters. He further advises his readers to place no dependence on the doctor, as "his interests unfortunately run exactly parallel with the impure stream." The latter statement thus generally applied is a very rash one indeed. There may be unprincipled doctors who fill their pockets at the expense of the health and lives of their patients, but it is a slander to include all, or even a majority of physicians in this category. The Local and Provincial Boards of Health, which have labored so energetically and successfully to combat disease and to educate the public in the department of sanitary knowledge, are composed largely of medical men. The unwillingness of the public to learn what precautioos are necessary against disease, or having this knowledge, the carelessness displayed in making the application of it, are the greatest hindrances in the way of lessening the extent of disease.

HOW TO SEASON TIMBER.

HOW to season timber so as to prevent the ravages of dry rot is something in which builders generally are interested. According to R. F. Francius, to preserve oak timber from dry rot it should be laid in large piles in salt water for a whole year, and so as to be completely covered with the water. By this means the salt penetrates the wood and the consequence is that it remains always free from dry rot and lasts twice as long as it would do without this preparation. It the wood can be put into sea water perfectly pure and free from all earth deposit it is so much the better, and on the coast it may be best kept in basins dug for the purpose. Care must of course be taken to lay it so that it cannot drift away. Where salt is very abundant, wood may be seasoned by covering it with a thick layer of that material, when the air is damp and foggy, without heavy rain. The salt also destroys dry rot in building, as may be proved by washing the wood infected repeatedly with strong brine made hot. New wood may be prepared for use in the some manner.—*Metal Worker.*

The Geneva, N. Y., *Courier* contains the following reference to the Dunning boiler, of which the Waterous Company, of Brantford, Ont., are the Canadian manufacturers:—"The *Courier* is pleased to refer to the incomparable Dunning boiler, the sales of which are almost phenomenally large and are constantly increasing. The industry has been closely watched by many Geoeva citizens who have noted the steady and firm increase of plant, machinery, etc. The number of boilers now in use of this manufacture is probably larger than that of any other steam heating device.

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

LINDSAY, ONT.—A large opera house is to be built here.

SARNIA, ONT.—It is proposed to build a new separate school here.

STRATHROY, ONT.—The Baptists will build a new church to cost $5,000

GEORGETOWN, ONT.—There is talk of putting in the electric light here.

BELLEVILLE, ONT.—Improvements to St. Thomas' church are contemplated.

BOWMANVILLE, ONT.—The congregation of Trinity church will rebuild at once.

PETERBOROUGH, ONT.—An addition 90x30 feet will be made to the bridge works.

MADOC, ONT.—A by-law granting $8,000 for a high school has been carried.

PORT ARTHUR.—There is a proposal to spend $175,000 on a system of waterworks.

OTTAWA, ONT.—A new iron bridge is to be built over the Chaudiere River, P. Q.

PENETANGUISHENE, ONT.—A company has been formed to build a large hotel at Sheau's Point.

REGINA, N. W. T.—About $60,000 worth of brick buildings will be erected here before the cold weather sets in.

ST. MARY'S, ONT.—The Town Council is visiting and inspecting the waterworks systems of other municipalities with the view of establishing a system here.

LONDON, ONT.—The Board of Works contemplates an expenditure of $20,000 on street improvements the present season.—The erection of a Normal school is being agitated here.

AYLMER, ONT.—Subscriptions are being taken to raise money for a memorial window to be erected in the new Presbyterian church in memory of the late P. M. Nairn, M. P. P.

STRATFORD, ONT.—Having got the electric light, an agitation is on foot for a system of sewerage.—The Council wants tenders for an iron bridge with stone abutments to cover a span of fifty feet.

KINGSTON, ONT.—St. James' church is to be improved at a cost of $8,500. The seating capacity will be doubled.—Tenders for the construction of a dry dock at Kingston will shortly be asked for, at an estimated cost of $300,000.

INGERSOLL, ONT.—Mr. Ed. Wassell, C. E., of this place, is prospecting and surveying the country around Ingersoll for the purpose of finding suitable water and site for a system of water works for that place.

HAMILTON, ONT.—A $5,000 addition is to be made to the Barton street school.—The congregation of St. James Reformed Episcopal church will build a fine new church at once.—A movement has been started with the object of erecting in this city an asylum for inebriates. Rev. Dr. Sexton can give particulars.

WINNIPEG, MAN.—Tenders are invited for the erection of station houses on the C. P. R., Pembina and South-western branches. On the Pembina branch stations will be built at Deloraine, Boissevain, Killarney, Thornhill, Pilot Mound, LaRiviere, Crystal City, Clearwater, Cartwright and Little Pembina. On the Southwestern branch stations will be put up at Treherne, Holland and Glenboro.

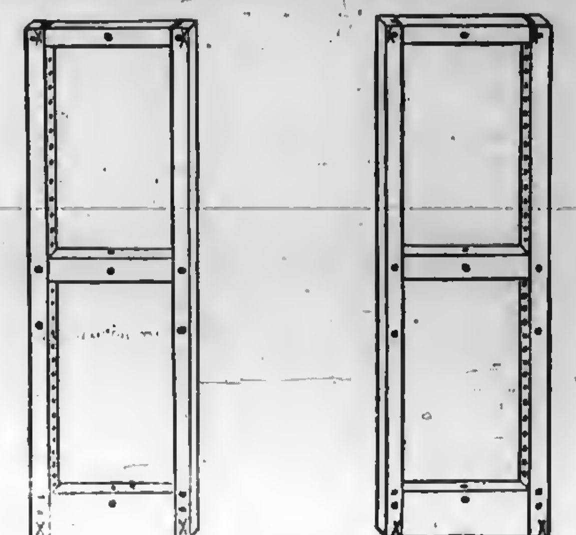
TORONTO, ONT.—Plans have been prepared for a new building for the Toronto Conservatory of music, designed to accommodate 2,000 pupils.—The following permits for the erection of new buildings have been issued from the office of the city commissioner during the last month: John Kidd, 2 storey and attic r. c. dwelling, Seaton st., cost $2,000; B. Hancroft, pr. detached 2 storey and attic brick dwellings, Bloor st., near Huntley, cost $16,000; Thomas Skippen, pr. s. d. r. c. dwelling, Baldwin st., cost $2,500; Ald. W. Hill, pr. s. d. 2 storey and attic bk. dwellings, Maitland st., cost $4,000; W. G. Holcombe, 2 prs. s. d. 2 storey and attic bk. dwellings, Spadina Ave., cost $12,000; Industrial Loan and Investment Co., 3 storey bk. factory, Lombard street; Mr. Foland, pr. s. d. 2 storey and attic r. c. dwellings, William st., cost $3,000; Consumers' Gas Co., 2 storey bk. boiler house, Berkeley st., cost $50,000; E. M. Moore, pr. s. d. 2 storey and attic r. c. dwellings, Bleeker st., cost $2,700; Consumers' Gas Co., 2 storey bk. meter house, Front st., cost $20,000; Mr. Muir, pr. s. d. 2 storey and attic bk. dwellings, Mutual & Maitland sts., cost $6,000; Mrs. Lawson, 5 att. 2 storey and attic bk. dwellings, Albert st., cost $6,000; J. J. Blain, pr. s. d. 2 storey and attic bk. dwellings, Rose Ave., cost $6,000; J. Waly, four att. 2 storey bk. dwellings, Sherbourne st., cost $7,000; C. R. Rundle & Co., five attached 2 storey and attic bk. dwelling, Moss Park Grove, cost $20,000; T. V. Gearing, pr. att. 2 storey and attic bk. dwellings and one 3 storey att. bk store, Gerrard street, east, cost $10,000; Mr. O'Rielly, pr. att. 2 storey r. c. dwellings, Agnes and Chestnut sts., cost $8,000; G. Noble, 3 storey bk. store, Ontario st. and Wilton Ave., cost $1,400; Mr. Black, 5 att. 2 storey and attic bk. dwellings, Gerrard st., west, cost $6,000; J. H. McKinnon, 2 storey and attic bk. dwelling, Jarvis st., cost $6,500; Thomas Thomason & Sons, alterations and additions, King street, east, cost $2,000; Mr. Sharpe, pr. s. d. bk houses, Maitland st., cost $7,5000.—Toronto University is to have a $45,000 building added to it for biological study.—The Toronto Normal School will have $20,000 improvements added to it.

MAKING BLINDS.

By Owen B. Maginnis.

As there are few mechanics outside of sash and blind shops who know how to properly make a pair of outside blinds, the following description showing how to commence and carry through a job of this kind may prove useful to any one who may have a pair to make:

Having the frame stuff (generally 1¼ inches thick in ordinary work,) sawn to the necessary lengths and widths, the first operation is to wind the stiles in this way: Take a pair, and having marked the face, sides and edges of each, lay one—which we will call the left stile—on the bench with the face edge from you and proceed to take a fore plane shaving off each top and bottom



corner on the stile as shown on the left hand side of the blind A. Do the same with the right hand stile keeping the face edge to you instead of from you like the last. When the rails are turned into these stiles the blinds will be in wind about a ¼ inch or the top right hand corner will hang in when the blind is hung on its hinges.

The stiles for the right hand blind are similar, or in other words, the stiles are all faced alike and can be turned end for end without altering the face marks or wind.

The reason for winding the stiles is this: When the blinds are closed the left hand blind B from the inside touches the window frame at the bottom outside corner, and the top stick out as the frame winds, and when the right hand blind (from the outside) is pulled to, the top outside corner presses the top outside corner of the left hand blind and draws it in against the frame and the catch at the bottom holds the joint tightly together, making the blinds level close against the frame and a tight joint on the rebate.

When laying out the stiles for mortising make the mortise the same width both edges, as the tenon fills it entirely, and there are no wedges used as they are liable to work loose with the constant wetting and drying of the weather. The shoulders of the rails are held to the edges of the stiles by pins driven through the mortise and tenon when the frame is in the clamps.

Cutting the slats should be very carefully done, and one or two of them should be tried in the frame, bringing the shoulders up with a couple of handscrews to see they work freely in the holes before pinning, and they should be placed oval and the edges properly rounded. The rods should next be cut and worked to the usual shape and the ends rounded to the same shape as the edges.

Before wiring the slats place them all together and with a try square mark the position of the staples (both points) on the poorest edges, and then drive them in. The slats can then be fastened on the rod which is marked from the stile, and the slats placed in the frame which is primed and cleared off.

This is the simplest method of making blinds by hand. They are, however, usually made in factories by a much quicker process, but if there be any builder stuck for one or even a pair of blinds, the above will aid him in making a sure job.

RECENT CANADIAN PATENTS.

System of Water Supply.

No. 28,952. William G. Russell, Millbrook, Ont., dated 18th April, 1888.

Claim.—1st. The pipes A, B, C and E, connected together, as described, in combination, with the globe-valve F, arranged substantially as and for the purpose specified. 2nd. The pipes A, B, C and E, connected together, as described, in combination with the globe valve F and rod G, arranged substantially as and for the he purpose specified. 3rd. The pipes A, B, C and E, connected together, as described, in combination with the globe valve F, rod G, and relief valve H provided with a lever I and adjustable weight J, substantially as and for the purpose specified. 4th. The pipes A, B, C and E, connected together, as described, in combination with the globe valve F, rod G, relief valve H provided with a lever I and adjustable weight J, and set-screws K and L, substantially as and for the purpose specified.

Water Leakage Detector.

No. 28,899. Thomas Houlgrave, Toronto, Ont., dated 14th April, 1888.

Claim. 1st. The combination of two diaphragms A, A, each consisting of two sub-diaphragms *a* and *a1* connected by a wire E, substantially as and for the purpose set forth. 2nd. The combination of the diaphragms A, A, the connecting wire E, the tightening rod D and the centre-pin C, substantially as and for the purpose set forth. 3rd. The combination of the diaphragms A, A, the connecting wire E and the telescope pipes F, substantially as and for the purpose set forth. 4th. The combination of the leakage detector, the slot *h* of the cap H, the sound uniting chamber *i*, the casting I, the key rod K and the cock J of the water main, substantially as and for the purpose set forth. 5th. The combination of the cap H, the casting I, the key rod K and the cock J, substantially as and for the purpose set forth. 6th. The combination of the cock J, a box L filled with sawdust, and the iron rod K, substantially as and for the purpose set forth.

The pillars used in the St. Clair tunnel will be made from the old G. T. R. car wheels.

The Marble Dealers' Association of Rutland, Vt., at a recent meeting elected as a director Mr. G. A. Sanford, of Halifax, N.S., who has been dead for several years.

At the Cincinnati Exposition Canada makes a fine display of terra cotta, tiles, bricks, building stone, black and colored marbles, etc.

A correspondent of the Montreal *Gazette* writes concerning the depreciation and in some cases total loss of plant used in the construction of the Panama Canal, owing to neglect and carelessness on the part of those in charge of the work. Quite recently, says this writer, a new 4,000 kilo. *grue*, or moveable crane, went off the line near the Culebra cut. They cost $2,500 each. Down the slight embankment it went. The intelligent foreman of that section, instead of making an effort to recover it, simply buried it by ordering in a train of dumping cars. The crane was buried and remains buried. Its burial simplified the whole matter. It was not his, and the company had dozens idle. Words fail to convey any idea of how machinery has been used there. An engineer told me that three-fourths of the $30,000,000 worth of machinery on the Isthmus is rusting and much of it is useless, valueless even as old metal, owing to its location. The Canal company takes credit for $30,000,000 worth of machinery on the Isthmus.

ROBERT MITCHELL & CO.

Montreal Brass Works, Montreal,

MANUFACTURERS OF

Church and other Gas Fixtures,

BRASSWORK

Of all kinds, including

ENGINEERS', PLUMBERS',
GAS and STEAM FITTERS'

SUPPLIES.

HEATING APPARATUS

Put up and buildings equipped with

AUTOMATIC

FIRE EXTINGUISHERS.

The "Daisy"

Warden King & Son

CRAIG ST. FOUNDRY, MONTREAL.

MANUFACTURERS OF

SPENCE PATENT HOT WATER BOILERS

The "Sectional," "Champion" and "Daisy"—the leading Hot Water Boilers of this continent.

3,000 in use. Send for testimonials and prices.

MANUFACTURERS AND SOLE AGENTS IN CANADA FOR

The New York Safety Dumb Waiter,

(STORMS' PATENT)

This Waiter is very favorably known in the United States; it is the most complete thing of the kind, being also cheap, substantial and durable. No house should be without one. Descriptive pamphlet sent on application.

MANUFACTURERS ALSO OF

Soil and Greenhouse Pipes and Fittings, Steam and Hot Water Fittings, Plumbers' Wares, Columns, Girders, circular and straight Iron Stairs, and all kinds of House and Machinery Castings.

UNVENTILATED BATH-ROOMS.

An unfortunate occurrence, which was lately the subject of a coroner's inquest, may now serve to introduce some remarks on the hygiene of the bath-room, with special reference to its frequent abuse when warm water is the means of ablution. About a fortnight since a gentleman aged seventy-four years was found sitting dead in a warm bath, which he had entered a short time previously. According to the medical evidence death was due to syncope, induced in all probability by the heat of the room. Here, doubtless, a predisposing cause was also at work—namely, the advanced age of the deceased, which would render him the more susceptibility to the always rather depressing influence of warm bathing. Add to these unfavorable, if unavoidable conditions, the presence of a stifling, steam-laden atmosphere, and we need not feel surprised at a statement by the coroner that deaths in similar circumstances are not uncommon. Now that almost every house of moderate rental has its bath-room, the size and ventilation of the apartments are matters of some importance. There is too great a tendency to think that any odd corner may be used for this purpose, and that the first and only necessity is to have the required water-supply laid on, and for the short time during which the bath is used the quality of atmosphere is quite a secondary matter. It should not need the teaching of a series of fatal accidents to impress an opposite principle. Clearly a room which, in course of use, becomes rapidly charged with water vapor should exceed rather than come short of the minimum cubic space (say 800 cubic feet) required for each inmate of a normally constructed house. With regard to ventilation, ancient prejudices in favor of closed doors and windows and solid walls have to be combated. These have, however, been pretty generally overcome in the case of sitting-rooms and bed-rooms, and should not prove insuperable in the case of the bath-room. There is no necessity for the introduction of cold air from without, for a sufficiently pure atmosphere can usually be obtained from the interior of the house, and an outlet funnel with revolving cowl is all that is required for extraction of the old air and excess of water vapor. Seeing therefore, that the remedies are apparent, we may hope that in future builders and householders will agree to employ them against the now too evident risks of a warm bath at home.—*Lancet.*

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$34 00@	35 00
1¼ and thicker, three uppers, Am ins.		40 00
1¼ and thicker, pickings, Am ins.		30 00
1 x 10 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
1 x 10 and 12 dressing	15 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
1 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1¼ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	16 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		15 00
1½ inch flooring		15 00
XXX shingles, sawn	$2 40 @	2 50
XX shingles, sawn	1 30	1 50
Eastlake painted iron shingles, per square, (10 feet)		4 50
Eastlake painted tin shingles, per square		4 50
Eastlake genuine galvanized iron shingles, per square		7 00
Imitation brick siding, per square		3 50
Special siding, per square		3 50
Lath, sawn		1 80

YARD QUOTATIONS.

Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		12 00
Shipping cull boards, stocks		13 00
Scantling and joist, up to 16 ft		14 00
" " 18 ft		15 00
" " 20 ft		16 00
" " 22 ft		17 00
" " 24 ft		19 00
" " 26 ft		20 00
" " 28 ft		22 00
" " 30 ft		24 00
" " 32 ft		26 00
" " 34 ft		28 50
" " 36 ft		30 00
" " 38 ft		32 00
" " 40 to 44 ft		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board	18 00	20 00
Dressing stocks	16 00	18 00
Picks, American inspection		40 00
Three uppers, American inspection		50 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 4 x 14, per M		12 00

B. M.

1¼ inch flooring, pressed	25 00	30 00
1½ " rough	14 00	15 00
1¼ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		2 25
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

BRICK.—℔ M.

Common Walling		$ 7 50
Good Facing		10 00
Sewer		9 50
Stone:		
Common Rubble, Per Toise, delivered		14 00
Farga flat " " "		18 00
Foundation Blocks, " Cubic Foot		35
Slate: Roofing (℔ *square*).		
" green	5 00	6 00
" " unfading	5 00	6 00
" purple	5 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me.	5 50	8 00
" black slate		7 50
Tiles, American, ℔ M		
N. Peach Bottom, warranted unfading		
Sand:		
Per Load of 1½ Cubic Yards		1 25

PAINTS. (*In oil,* ℔ *lb.*)

White lead, Can	6	6 50
" zinc, Can	6½	8 50
Red lead, Eng	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" Indian, Eng	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (℔ *Imp. gal.*)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3
Whiting, dry	75	1 00
Paris white, Eng., dry	1 25	1 50
Litharge, Am., "	6½	8
Sienna, burnt	15	20
Umber, "	8	12½

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey		40
" " " White		60
Plaster, Calcined, New Brunswick		2 20
" " Nova Scotia		2 10
Hair, Plasterers', per bag		1 00
Cement, Portland, per bbl		3 00
" Thorold, "		1 50
" Queenston, "		1 50

HARDWARE.

Cut Nails:		
American Pattern, 1¼ inch, per keg		4 40
" " 1½ to 1¾ inch, per keg		3 65
Canadian Pattern, 1¼ inch, per keg		3 90
" " 1½ to 1¾ inch, per keg		3 40
" " 2 to 2¼ inch, "		3 40
" " 2½ to 2¾ inch, "		3 15
" " 3 inch and larger		2 90
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg		6 05
" " 1¼ inch, "		5 30
" " 1½ " "		5 05
" " 1¾ " "		3 60
" " 2 inch and larger		4 00
Iron, etc.		
Refined, ℔ 100 lb. or ordinary size	2 25	2 35
Common, ℔ 100 lbs	2 00	2 10
Patent metals, ℔ lb	0 00	0 11
Anchors, ℔ lb	0 05½	0 06
Chain cables, ℔ lb	0 03	0 06
Rigging chains, per lb	0 03	0 3⅔
Galvanized Iron Roofing, per square		5 00

MONTREAL PRICES.

Lumber, Etc.		
Ash, 1 to 4 in., M	$13 00@	20 00
Birch, 1 to 4 inch, M	16 00	25 00
Basswood	13 00	20 00
Walnut, per M	55 00	95 00
Butternut, per M	25 00	40 00
Cedar, flat	00 04	00 06
Cherry, per M	65 00	90 00
Elm, Soft, 1st	15 00	17 00
Elm, Rock	25 00	30 00
Maple, hard, M	20 00	25 00
Maple, Soft	16 00	24 00
Oak, M	40 00	80 00
Pine, select, M	35 00	40 00
Pine, 2nd quality, M	23 00	27 00
Shipping Culls	14 00	16 00
Mill Culls	8 00	10 00
Lath, M	1 70	1 85
Spruce, 1 to 2 inch, M	10 00	13 00
" Culls	4 50	6 00
Shingles, 1st quality	2 00	3 00
" 2nd "	1 25	2 00
Cement, etc.		
Portland Cement, per barrel	$ 2 45@	2 75
Roman " "	2 70	3 00
Fire Bricks, per M	22 50	25 00
Cut Nails:		
Hot-cut Am. or Can. pattern, 3 inch and above		$2 60
Hot-cut Am. or Can. pattern, 2¾ inch and above		2 85
Hot-Cut Am. or Can. pattern, 2¼ and 2 inch		3 10
Am. pattern, 1½ and 1¾ inch hot-cut		3 35
" 1¼ inch " "		4 10
Can. Pattern, cold-cut, 1½ and 1¾ inch		3 20
" " 1¼ inch		3 90
Finishing Nails, per 100 lb. keg, 1¼		
Finishing Nails, per 100 lb. keg 1½ to 1¾ inch	4 25	4 40
and 1½ inch	$ 5 25	4 70
Finishing Nails, per 100 lb. keg, 2 inch and up		3 70
Paints, etc.		
White Lead, pure, 25 to 100 lb. kegs	6 00	6 25
" No. 1	5 25	5 50
" No. 2	4 75	5 00
" No. 3	4 50	4 75
dry	5 25	5 75
Venetian Red, English	1 50	1 75
Yellow Ochre, French	1 25	3 00
Whiting, London, washed	0 50	0 60
" Paris, "	1 15	1 25
Oils:		
Linseed, raw	0 53	0 57
" boiled	0 57	0 60
Olive, pure	1 00	1 10
" machinery	0 95	1 00
" extra, qt., per case	3 00	3 25
" pts., "	2 40	2 60
" ½ pts., "	2 70	3 00
Spirits turpentine	0 55	0 60

ST. JOHN, N. B.

Lumber.		
Spruce deals, Bay Fundy Mills	8 00	8 25
Spruce deals, City Mills	8 50	9 50
Aristook P. B., Nos. 1 and 2	40 00	45 00
No. 3	30 00	35 00
No. 4	15 00	20 00
Aristook P. B. shipping	15 00	16 00
Common	12 00	13 00
Spruce boards	7 00	8 00
Spruce scantling (unst'd)	7 00	8 00
Spruce, dimensions	11 00	14 00
Pine clapboards, extra	5 00	40 00
No. 1	0 00	30 00
No. 2	30 00	20 00
No. 3	11 00	12 00
Laths, spruce	1 25	1 35
Laths, pine	5 50	8 00
Palings, spruce	5 50	8 00
Iron, etc.		
Refined, ℔ 100 lb or ordinary size	2 25	0 00
Pommon, 100lb	2 10	0 00
Aateot metals, ℔ lb	0 00	0 11
Cnchors, ℔ lb	0 00	0 00
Chain cables, ℔ lb	0 03	0 06
Rigging chains, ℔ lb	0 03	0 3⅔
Nails.		
Cut, 3dy, ℔100lb	3 75	4 00
Cut, other sizes	2 74	3 50
Ship Spikes	3 70	5 00
Galvanized	5 25	6 50

TENDERS

— FOR NEW —

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For the City of Toronto.

NOTICE is hereby given that the time for receiving tenders for the erection of these buildings has been extended until noon on MONDAY, the 27th Day of August, 1888. All further information may be obtained from E. J. LENNOX, Architect, corner of Yonge and King streets, Toronto.

JOHN JONES,
Chairman Court House Committee.

Toronto, July 30th, 1888.

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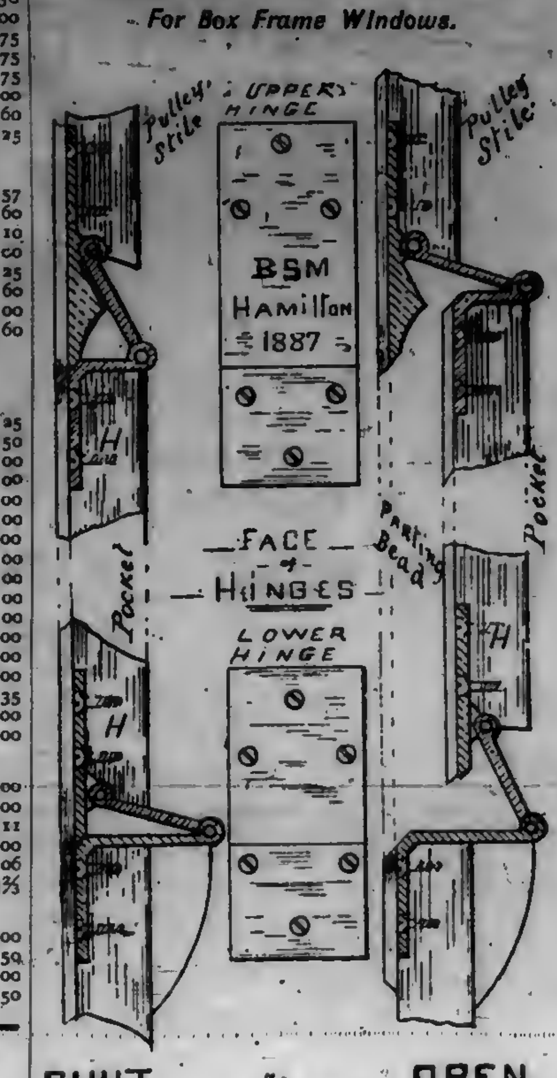
IMPROVED PULLEY STILE HINGE

For Box Frame Windows.



SHUT — " — OPEN (to take out Sash)

With the above hinges the ordinary double hung window sashes can be taken out of the frames for cleaning, &c., without disturbing the stops or parting beads, and are the result of long experiment, to insure strength and perfect action. The parting beads are cut to mitre, and slide in with the pockets H, to clear the check of sash—thus the sash recedes in at one side, and clearing the opposite parting bead is taken out, the pulley boxes are in the pockets H, and the lines are held in a lock plate on inside of sash by means of a knot on the end of the line, which is released and run up to the pulley box in taking out the sash. The attention o architects and builders is called to these hinges. For further information and price apply to the inventor,

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Can be applied by any one.

FIRE, WATER and FROST-PROOF.

PRICE LIST.

2 Ply Roof Sheathing, per 100 sq. ft.	$2 25
3 " " " " "	3 00
Tin Caps, 1 lb. to 100 sq. feet	10

ROOFING CEMENT-PAINT, "Opaline" and "Hyaline," to cover sheathing. 1½ gallons to 100 square feet, in barrel lots.

"Opaline," to be applied hot, per gallon,	$ 25
"Hyaline," to be applied cold	35

All kinds of roofs covered by our Fire and Water-Proof Cement-Paint at $1.25 and $1.35 per square, according to kind preferred.

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A SINGLE TRIAL OF OUR ASBESTOS ROOF SHEATHING WILL GUARANTEE ITS FUTURE USE.

HOW IT IS MADE.

Its fire and water-proof component parts are combined as follows:—

3-PLY—1st. A strong foundation of saturated Asbestos Wool. 2nd. A water-proof layer of Vegetable Gum. 3rd. A sheet each of best saturated roofing felt and Asbestos wool. 4th. Another layer of Vegetable Gum. 5th. Compressed Felt and Wool. All these are subjected to hydraulic pressure and formed into a solid impermeable sheet, and when put on coated with fire and water-proof Cement-Paint.

2-PLY—Has one layer less of Felt and Wool and Vegetable Gum.

The merits of this Roofing are that it is inexpensive, durable, adapted to steep or flat roofs, portable, convenient, fire-proof, will not mildew, can be used over old shingles or tin, not affected by gases or condensation, easy to preserve by renewal of coating, a splendid sheathing, water, frost, air and vermin proof. Can be applied by unskilled labor.

DIRECTIONS FOR APPLYING.

Sweep the boards of the roof clean of all nails, chips, etc., then commence at the eaves or gutter to lay the roofing; nail the lower ends, using ordinary lath nails with thin heads, shielded by tin caps. Then let the second sheet lap over the first sheet two inches, being SURE to paste all laps with the Cement-Paint, then nail as before and so repeat. Use great care in fitting around chimneys, gutters, etc.

Upon flat roofs nails should not be more than one and one-half inches apart from centre of caps, and two inches on steep roofs. The roofing should receive a coat of Cement-Paint the DAY IT IS LAID, unless it gets wet; if caught in a shower wait until the Sheathing dries before coating and sanding. The Roofing Cement-Paint should be applied in strips from ridge to eaves, beginning at end of building and working across to the other end. Use all the Cement-Paint the Sheathing will absorb without running, applying the sand as you go. *Use no Gravel in any case.*

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Office of New York Board of Fire Underwriters,
115 Broadway, New York, April 15, 1884.

DEAR SIR, — The Insurance rate on buildings covered with NEWTON'S Prepared Roofing, painted with one coat of Victoria Cement-Paint, sanded, is the same as the regular slate on metal roofs.

Yours truly, JAMES HARRISON,
Supt. for New York Board of Underwriters.

16 St. Henri Street, Montreal, April 7, 1888.

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Yours truly, HAMMOND & CRANDALL.

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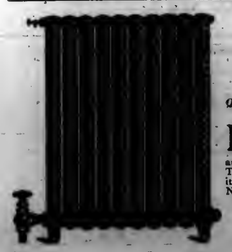

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SECTIONAL HOT WATER AND STEAM RADIATOR

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Quick Circulation; Easily Repaired; Its Capacity increased at very Little Extra Cost; does not need a Fancy Cast Iron Top or Marble Slab; in fact, Just the Radiator that Suits the Requirements of the Market.

BY the construction of this Radiator, each section has (entirely distinct from each other) a separate and positive circulation within itself, producing not one slow, sluggish, continuous circulation, but as many sharp and constant circulations as there are sections composing the Radiator, thereby maintaining a greater heat from a given surface. It has another advantage that will be appreciated by the Trade; the inlet and outlet are both at the same end, and has been arranged that it may be used for Hot Water or Steam without making any changes to the connections, or any alterations whatever—a feature possessed by no other Radiator that we are aware of. We also claim that with this Radiator any person in the Trade can replace a section, or add sections to increase its capacity, without returning it to the manufacturer. This alone is an advantage, particularly in cases outside the city in which it is manufactured. These Radiators are now fitted up in the following buildings, viz., Hull Post Office, Peterborough Post Office, Pictou Custom House, N.S.; Pictou Marine Hospital, N. S.; Winnipeg Custom House, Kingston Custom House, Three Rivers Custom House, Point St. Charles Post Office, and many other private dwellings.

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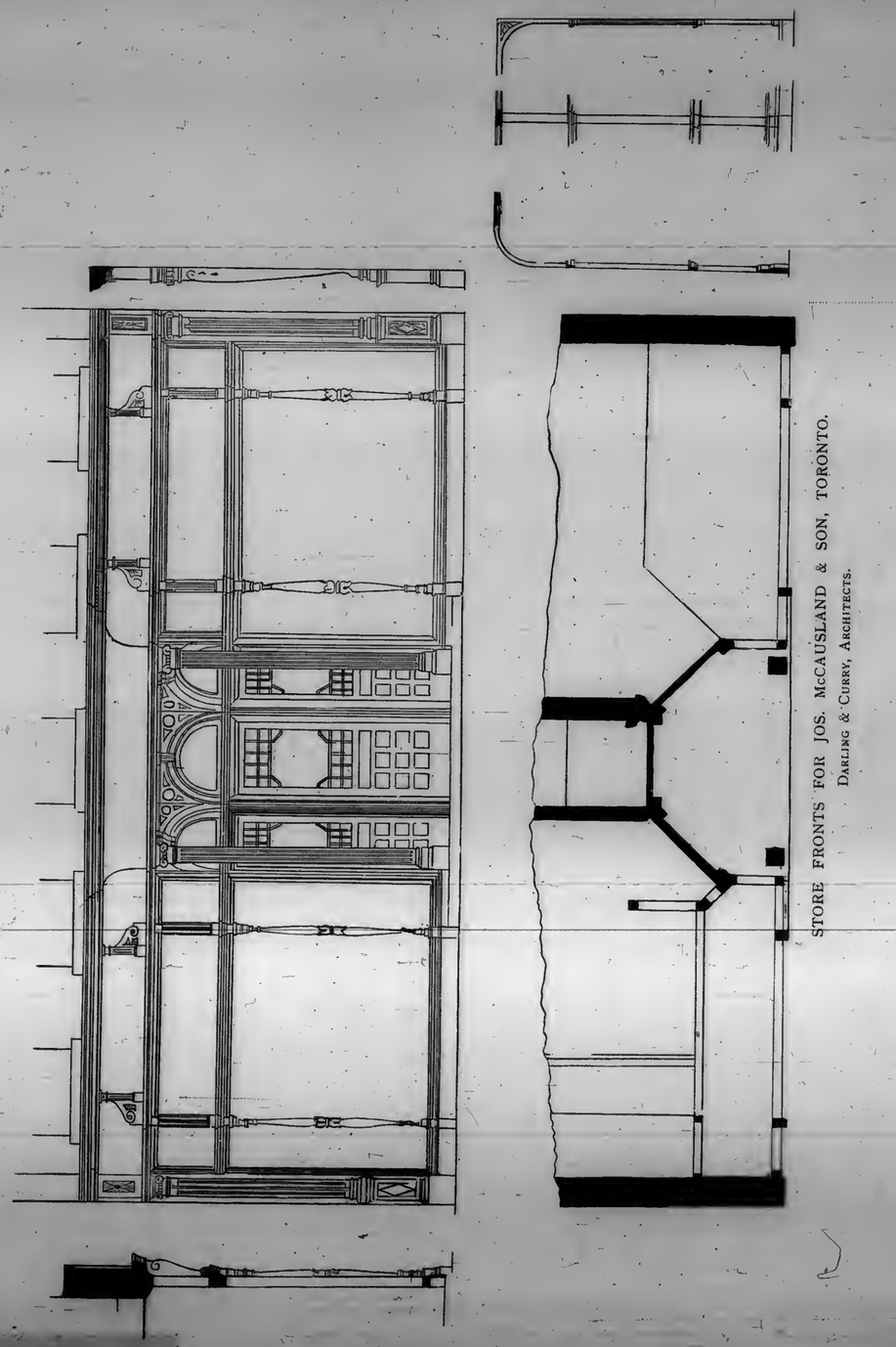

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VOL. I.—No. IX. TORONTO, CANADA, SEPTEMBER, 1888. PRICE 20 CENTS $2.00 PER YEAR.

THE

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

PUBLISHED MONTHLY IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

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The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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ADVERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

WE read of the caving in of sewers at Brantford and Woodstock., Ont., with injury to workmen, emphasizing the remarks made in the CANADIAN ARCHITECT AND BUILDER a month or two ago regarding the necessity which exists for a closer oversight of the means employed by contractors to protect the lives of workmen engaged in excavations of this kind.

THE City Solicitor has given it as his opinion that the clause in the Toronto Plumbing By-law which stipulates that no person shall receive a plumbing license in Toronto who is not a "Canadian by birth or naturalization," is unreasonable, and would therefore be held to be invalid. As the striking plumbers have been seeking to take advantage of this clause to prevent the employment of imported workmen, the information conveyed by the Solicitor will prove anything but acceptable to them.

WE are pleased to observe that the labor congress held at London, Ont., the other day, promised to give its hearty support to any practical efforts tending to reduce the consumption of intoxicating liquors. One of the greatest enemies to the prosperity and advancement of workingmen is the saloon. In recognizing this, and in resolving to combat the evil resulting from the drinking customs, the labor congress adopted one of the quickest and surest methods of raising to a higher physical, intellectual and moral status the condition of the class it represents.

THE Mayor of Toronto is entitled to much credit for the settlement which he has been the means of bringing about with the University authorities in regard to a renewal of the Queen's Park lease. The Mayor proposes that the city shall pay as a yearly endowment to two chairs in Toronto University the sum of $6,000 in addition to the cost of maintaining the park and approaches thereto in proper order. This proposition the University authorities have signified their willingness to accept, and the difficulty is therefore as good as settled. Every citizen of Toronto must rejoice at such a happy outcome of a case in which the decision of the courts was adverse to the city, and under which decision the citizens would have been deprived of the park and avenues on the improvement of which they have expended vast sums of money. The loss of the Queen's Park would have been well-nigh irreparable, owing to the impossibility of securing as much land elsewhere in the centre of the city for park purposes. As to the $6,000 endowment which it is proposed to give to the University, this much can be said: a large number of the students at the University are the sons and daughters of citizens of Toronto, and the money which the city gives for the purpose of increasing the efficiency of the institution they will receive back indirectly in the better education of their children. While the citizens of Toronto have cause to congratulate themselves that the city has come so well out of this difficulty, they and their representatives in the Council should in future guard against putting in office men who by the neglect of their duties may at any time involve the city in difficulty and loss.

ATTENTION has been called by the loss of life resulting from several holocausts which have lately taken place in New York city, to the inadequacy of the means provided for escape in case of fire, of persons located in high buildings. We are probably more neglectful than our neighbors in this particular. It is the exception rather then the rule to see buildings in Canadian cities provided with fire escapes. Some day, doubtless, we shall be startled to learn that a number of human lives have been lost as a result of carelessness in a matter which calls for the greatest precaution.

IN proof of the saying that "it's an ill wind that blows nobody good," the news comes that a cyclone which recently passed over the fever-stricken city of Jacksonville, Florida, cleared the atmosphere, lowered the temperature and washed perfectly clean the surface of the streets. In the opinion of the physicians the result tended to materially lessen the infection. We observe that the cyclone in question is described as a moderate one. As there is no means of regulating cyclonic force, sanitarians do not anticipate that it will be likely to come into popular favor as a remedial agent.

THE new Court House and City Hall enterprise for the city of Toronto, after lying dormant for many months, has been advanced a stage. Tenders have been received and opened for the whole work. The figures in these tenders aggregate $1,305,034. The Council has on hand for the erection of these buildings something over $800,000. Since the tenders were opened, it has been decided to ask the citizens to vote $600,000 more to carry the work to completion. We understand it is the intention to place the designs for the buildings on exhibition in some public place where the citizens will have an opportunity to see and examine them. Having examined them, we may be allowed to express the opinion that the buildings erected from them will prove a credit to Mr. Lennox, the arcbitect, and to the city of Toronto. We have therefore no hesitation in saying that the citizens should vote the extra amount required to successfully carry out the enterprise. As we have before pointed out, this city is growing at a surprisingly rapid rate. It has doubled its population during the last ten years. Ten years hence we may reasonably expect that the population will have reached at least a quarter of a million. In view of these facts, it would be anything but economy or wisdom to erect a cheap structure for the purposes of a city hall and court house. The money which the citizens are now asked to give will insure the erection of buildings that will be sufficiently commodious for the requirements of the future, while at the same time they will stand as an imposing public ornament for all time to come. The citizens must now assume the important responsibility of deciding what the character of the new buildings shall be. Let the decision be a wise one.

THE professional labor agitators have evidently a strong hold upon the managers of several of the Toronto daily papers, if indeed they do not actually edit or write some of the articles bearing on the relations of employers and employees appearing therein. In the early days of the plumbers' strike in Toronto, these papers, instead of discussing the situation from an impartial standpoint, allowing that blame might rest upon both parties, and counselling mutual concessions for the purpose of bringing about a speedy settlement of the dispute, took the ground at the start that the conduct of the employers was characterized by selfishness, injustice and unreasonableness. In taking this unwise position, the papers in question were really doing the strikers an injury instead of rendering them assistance. The strikers were patted on the back and told that victory was sure to be theirs, which had the effect of making them refuse to recede from any of their demands. The employers were called hard names, which only made them the more determined to fight the thing out. A little judicious advice might have helped to end the difficulty long ago. Now that the strikers have virtually suffered defeat, the agitators who inspire the articles in the daily press would fain undo the mischief they have done, and are advising conciliatory measures. One journal says:—The strike has continued long enough for both parties to learn to respect each other. The fight has been prolonged and bitter, and as far as both are concerned there has not been the slightest change in the situation for at least ten weeks. It is time now that milder counsels prevailed and that both sides should reason together. There must be some common level upon which both sides can meet. There is no disgrace in an honorable treaty in which both sides make concessions, neither is it generous even for a victor to take an unfair advantage of a brave, but vanquished opponent. Let the master plumbers and the strikers each appoint a committee of sober level headed members, giving the hot heads and fire brands a chance to stay in the back ground, and there is not the slightest doubt that the strike will be at an end inside of twenty-four hours, and that both sides will be satisfied. Let there be no delay; because every day lost in idle contention is so much time lost that can never be recalled. A man may lose a fortune and make it again, but a day's labor lost is an injury not only to the man that loses it, but to the community at large that can never be repaired. This is the opinion of the majority on both sides, and why should it not be acted upon at once?" The journals would have better served the interests of all concerned in this unfortunate difficulty, but especially of the workmen and their families, had they advocated "milder counsels," at the beginning. Let us hope that in future the "hot heads and fire brands" will not be allowed free scope in the columns of the daily press.

THE inferior quality of our workmen, if we may be allowed to speak of them in this way, calls for some radical change from present methods, if we are to attain as a people the position to which we are justly

entitled. The old method of apprenticeship, in the days when machinery was not the power which it is now, produced superior workmen. The present method, which is largely the result of the introduction of machinery, produces but few good mechanics, and a very large number of botches. If we accept the above as facts—and we must do so—are we to quietly admit the situation and do nothing, or are we like men to make an effort to overcome the difficulties and secure an intelligent and competent body of workmen? The attempt, it is true, must be made in the face of strong opposition from the workmen themselves, but even such opposition will not make the attempt, if it should be made, a forlorn one.

We will consider what might be done to the betterment of one of the building trades, and that the most important of all. The ordinary carpenter has no theoretical knowledge, and we regret to say, but little manual dexterity. His object is not so much to acquire knowledge and skill that he may do good work, as to acquire what will enable him to obtain average wages. That the ordinary mechanic should be thus easily satisfied, is a mystery in this land, where the greater number are working like slaves to acquire a higher position than they now hold. It may be that the retarding circumstances surrounding the workman in the building trades are too great to be overcome except by a long, earnest and sustained effort. That apprentices have not a fair chance to learn any one of the building trades, is an admitted fact. Between the selfishness and indifference of their employers, and the persistent efforts of the unions to place impediments in their road to knowledge, the apprentice has in the present day an uphill fight to make to become a skilled workman. It is no doubt true that one half of them are not anxious to become skilled mechanics, and that if opportunities were given, they would not make an effort to take advantage of them; but as the State is interested in all men having the largest amount of knowledge they can make use of, it is necessary that some means be adopted to enforce the acquiring of mechanical or other skill to enable the individual to earn a living. The industrious should not support the idle, nor should the ignorant workman be supported by the intelligent and skillful mechanic.

We believe that this evil has become so great, that the Government should take hold of the matter. To that end we would suggest that an Apprenticeship Act should be passed, under which all boys desirous of learning trades should be indentured, with a distinct and clearly drawn clause showing how and in what they are to be instructed. The Government should also establish schools to give theoretical training, and all apprentices should be compelled to attend such schools. There should be a reasonable number of examinations to test the knowledge of the students, and at the close of the apprenticeship course the student should receive a diploma stating his proficiency in the different subjects taught. There should also be an inspector to see that apprentices were being given proper instruction in the manual branches of their trades. The employer with whom the apprentice has served should fill out a certificate stating distinctly and clearly his accomplishments and skill, which should be countersigned by the inspector. With such a system as this, every opportunity would be given the intelligent apprentice to become a skillful mechanic. He would also be very much benefitted by the theoretical training he would receive, and which now he has to do without.

SANITARY SCIENCE IN THE HOUSE.

In a lecture on "Sanitary Science in the Home," Mrs. R. H. Richards, who is one of the instructors in the Massachusetts Institute of Technology in Boston, says: "I know no man will dare say it in so many words, and, therefore, it is the more incumbent upon me to do so. I am sure if the much abused architects and builders were to speak their minds they would say that it was the women who hindered them from carrying out the plans which they know to be best. How can a builder survive the scorn which greets him when he proposes to leave all the drain pipes exposed? How can he put hoods over the gas-burners when the artistic sense of the woman who is to occupy the room is offended? How can he convince the women of the family that they should wear thicker clothing in the house in the winter, and not expect to have a whole house made so comfortable that they can wear thin slippers and silk dresses in weather approaching that of the Arctic regions? Does it avail for him to argue with them? Must he not cater to their tastes? And, as they are the ones who live nine-tenths of the time in the house, the man of the family lets them have their own way."

ARCHITECTURE

CIRCULAR

OF THE COMMITTEE OF CONFERENCE OF THE AMERICAN INSTITUTE OF ARCHITECTS, THE WESTERN ASSOCIATION OF ARCHITECTS AND THE NATIONAL ASSOCIATION OF BUILDERS ON A STANDARD FORM OF CONTRACT.

Dear Sir,—The Committee of Conference on a Standard form of Contract, appointed at their last Annual Conventions by the several Associations above named, beg leave to present the accompanying specimen copy of such Contract as the result of their united labors in that behalf, and respectfully ask its adoption by you in your practice.

The object sought to be obtained by the Committee was to obtain a Form of Contract which could be received and adopted generally by architects and builders as a Standard Form, and in which the several provisions necessary to constitute an equitable agreement, as between the owner and the builder, would be incorporated. The Joint Committee were empowered by their respective Associations to prepare and adopt such a Form of Contract, and this work, as embodied in the accompanying printed copy, may be said to be the authorized Standard Form of said Associations.

The action of the Committee in this regard was as follows: After an exchange of views through correspondence, an arrangement was made to have the Committee meet in the City of New York. Accordingly such a meeting took place on the 6th of June, ult., and an organization was effected by electing a Chairman and Secretary. This meeting was adjourned from day to day, daily sessions and one evening session being successively held—until the labors of the Committee were essentially completed. The matter was then referred to a sub-Committee, to revise the manuscript for publication. It was afterwards submitted individually to the several members of the Committee, subjected again to another revision, and finally adopted as printed.

In order to preserve the Form from errors, alterations or interpolations, it has been copyrighted. It is the general intention of the members of the National Association of Builders to have it understood that in all cases where proposals for any work are submitted by them, such proposals are made with the understanding that the contract made upon this Standard Form is the one that is to be executed by them upon such proposals.

The Inland Publishing Company, 19 Tribune building, Chicago, Ill., has been licensed to publish the blanks, and any number of copies, with prices, etc., can be obtained from them on application. The blanks will be furnished at $1.10 per 100, $4.25 per 500, and $8 per 1,000, free by mail or express. Architects can have their names and the consequent pronouns inserted, as they may order, at small additional cost.

The members of the Committee of Conference, appointed by their several associations, are as follows:

Of the American Institute of Architects.
O. P. Hatfield, New York, N.Y.
Alfred Stone, Providence, R.I.

Of the Western Association of Architects.
J. H. Windrim, Philadelphia, Pa.
S. A. Treat, Chicago, Ill.
W. W. Clay, Chicago, Ill.

Of the National Association of Builders.
J. F. Alexander, Lafayette, Ind.
John S. Stevens, Philadelphia, Pa.
Geo. C. Pressing, Chicago, Ill.
John J. Tucker, New York, N.Y.

O. P. Hatfield, Chairman.
Wm. H. Sayward, Secretary.
164 Devonshire St., Boston.

New York, August 8, 1888.

FORM OF CONTRACT ADOPTED BY THE JOINT COMMITTEE OF THE AMERICAN INSTITUTE OF ARCHITECTS, THE WESTERN ASSOCIATION OF ARCHITECTS AND THE NATIONAL ASSOCIATION OF BUILDERS.

This agreement, made the——day of——in the year one thousand—hundred and——by and between——part of the first part, (hereinafter designated the *Contractor*;) and——part of the second part (hereinafter designated the *Owner*;)

Witnesseth that the contractor, being the said part of the first part, in consideration of the covenants and agreements herein contained on the part of the Owner, being the said part of the second part, do covenant, promise and agree with the said Owner, in manner following, this is to say:

1st. The Contractor shall and will well and sufficiently perform and finish, under the direction, and to the satisfaction of——Architect (acting as agent of said Owner), all the work included in the——agreeably to the drawings and specification made by the said architect, and signed by the parties hereto, (copies of which have been delivered to the Contractor), and to the dimensions and explanations thereon, therein and herein contained, according to the true intent and meaning of said drawings and specifications, and of these presents, including all labor and materials incident thereto, and shall provide all scaffolding, implements and cartage necessary for the due performance of the said work.

2d. Should it appear that the work hereby intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the said drawings, or in the said specification, the Contractor shall apply to the Architect for such further drawings or explanations as may be necessary, and shall conform to the same as part of this contract, so far as they may be consistent with the original drawings, and in event of any doubt or question arising respecting the true meaning of the drawings and specifications, reference shall be made to the Architect, whose decision thereon, being just and impartial, shall be final and conclusive. It is mutually understood and agreed that all drawings, plans and specification are and remain the property of the Architect.

3d. Should any alteration be required in the work shown or described by the drawings or specifications, a fair and reasonable valuation of the work added or omitted, shall be made by the Architect, and the sum herein agreed to be paid for the work according to the original specification, shall be increased or diminished as the case may be. In case such valuation is not agreed to, the Contractor shall proceed with the alterations, upon the written order of the Architect, and the valuation of the work added or omitted shall be referred to (3) three Arbitrators (no one of whom shall have been personally connected with the work to which these presents refer), to be appointed as follows: one by each of the parties to this contract, and the third by the two thus chosen; the decision of any two of whom shall be final and binding, and each of the parties hereto shall pay one-half of the expenses of such reference.

4th. The Contractor shall within twenty-four hours after receiving written notice from the Architect, to that effect, proceed to remove from the grounds or building, all materials condemned by whether worked or unworked, or take down all portions of the work which the Architect shall condemn as unsound or improper, or as in any way failing to conform to the drawings and specifications, and to the conditions of this contract. The Contractor shall cover, protect and exercise due diligence to secure the work from injury, and all damage happening to the same by neglect, shall be made good by

5th. The Contractor shall permit the Architect, and all persons appointed by the Architect, to visit and inspect the said work or any part thereof, at all times and places during the progress of the same, and shall provide sufficient, safe and proper facilities for such inspection.

6th. The Contractor shall and will proceed with the said work, and every part and detail thereof, in a prompt and diligent manner, and shall and will wholly finish the said work according to the said drawings and specifications, and this contract, on or before the——day of——in the year one thousand——hundred and——(provided the possession of the premises be given the Contractor, and lines and levels of the building furnished him, on or before the——day of——in the year one thousand——hundred and——), and in default thereof the Contractor shall pay to the Owner——dollars for every day thereafter that the said work shall remain unfinished, as and for liquidated damages.

7. Should the Contractor be obstructed or delayed in the prosecution or completion of the work by the neglect, delay or default of any other contractor; or by any alteration which may be required in the said work; or by any damage which may happen thereto by fire, or by the unusual action of the elements, or otherwise; or by the abandonment of the work by the employees through no default of the Contractor, then there shall be an allowance of additional time beyond the date set for the completion of the said work; but no allowance shall be made unless a claim is presented in writing at the time of such obstruction or delay. The Architect shall award and certify the amount of additional time to be allowed; in which case the Contractor shall be released from the payment of the stipulated damages for the additional time so certified and no more; The Contractor may appeal from such award to arbitrators constituted as provided in Article 3d of this contract.

8th. The Contractor shall not let, assign or transfer this contract, or any interest therein, without the written consent of the Architect.

9th. The Contractor shall make no claim for additional work unless the same shall be done in pursuance of an order from the Architect, and notice of all claims shall be made to the Architect in writing within ten days of the beginning of such work.

10th. The Owner agree to provide all labor and material not included in this contract in such manner as not to delay the material progress of the work, and, in the event of failure so to do thereby causing loss to the Contractor, agree that will reimburse the Contractor for such loss; and the Contractor agree that if shall delay the material progress of the work so as to cause any damage for which the Owner shall become liable (as above stated), then shall make good to the Owner any such damage—over and above any damage for general delay herein otherwise provided; the amount of such loss of damage, in either case, to be fixed and determined by the Architect, or by arbitration, as provided in Article 3d.

11th. The Owner shall effect insurance on said——work, in his own name and in the name of the Contractor, against loss or damage by fire, in such sums as may from time to time be agreed upon with the Contractor, the policies being made to cover work incorporated in the building, and materials for the same in or about the premises, and made payable to the parties hereto, as their interest may appear.

12th. Should the contractor at any time refuse or neglect to supply a sufficiency of properly skilled workmen, or of materials of the proper quality, or fail in any respect to prosecute the work with promptness and diligence, or fail in the performance of any of the agreements on part herein contained, such refusal, neglect or failure being certified by the Architect, the Owner shall be at liberty, after three days written notice to the Contractor, to provide any such labor or materials, and to deduct the cost thereof from any money then due or thereafter to become due to the Contractor under this contract; and if the Architect shall certify that such refusal, neglect or failure is sufficient ground for such action, the Owner shall also be at liberty to terminate the employment of the Contractor for said work and to enter upon the premises and take possession of all materials thereon, and to employ any other person or persons to complete the work, and to provide the materials therefor; and in case of such discontinuance of the employment of the Contractor, he shall not be entitled to receive any further payment under this contract until the said work shall be wholly finished, at which time, if the unpaid balance of the amount to be paid under this contract shall exceed the expense incurred by the Owner, in finishing the work, such excess shall be paid by the Owner to the Contractor, but if such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, either for furnishing materials or for finishing the work and any damage incurred through such default, shall be audited and certified by the Architect, whose certificate thereof shall be conclusive upon the parties.

13th. And it is hereby mutually agreed between the parties hereto, that the sum to be paid by the Owner to the Contractor for said work and materials shall be——subject to additions or deductions on account of alterations as herein before provided, and that such sum shall be paid in current funds by the Owner to the Contractor, in instalments as follows:

It being understood that the final payment shall be made within——days after this contract is completely finished, provided, that in each of the said cases the Architect shall certify in writing that all the work upon the performance of which the payment is to become due has been done to satisfaction; and provided further, that before each payment, if required, the Contractor shall give the Architect good and sufficient evidence that the premises are free from all liens and claims chargeable to the said Contractor; and further, that if at any time there shall be any lien or claim for which, if established, the Owner or the said premises might be made liable, and which would be chargeable to the said Contractor, the Owner shall have the right to retain out of any payment then due, or thereafter to become due, an amount sufficient to completely indemnify against such lien or claim, until the same shall be effectually satisfied, discharged or cancelled. And should there prove to be any such claim after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging any lien on said premises, made obligatory in consequence of the former's default.

14th. It is further mutually agreed between the parties hereto, that no certificate given or payment made under this contract, except the final certificate or final payment, shall be conclusive evidence of the performance of this contract either wholly or in part, against any claim of the Owner, and no payment shall be construed to be an acceptance of any defective work.

15th. And the said Owner hereby agree with the said Contractor to employ, and hereby employ to provide the materials and to do the said work according to the terms and conditions herein contained and referred to, for the price aforesaid, and hereby contract to pay the same, at the time, in the manner, and upon the conditions above set forth.

16th. And the said parties for themselves, their heirs, executors, administrators and assigns, do hereby agree to the full performance of the covenants herein contained.

In Witness Whereof, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

In presence of

CONDITIONS OF "MEASURED DRAWINGS" COMPETITION OF THE ARCHITECTURAL GUILD OF TORONTO.

THIS competition is only open to students of not more than four years standing in the offices of members of the Guild, and a certificate to that effect signed by the architect in whose office the student may be, must accompany each set of drawings.

All drawings are to be sent in under "motto," or "cipher," *fac simile* of motto or cipher to be enclosed with certificates.

The drawings must be made in Indian ink, on white paper, to allow of the drawings being illustrated.

The subject of the competition is the "Eastern Entrance of the University Buildings," Toronto, and the following drawings are to be made:

1st. Plan to ½ inch scale.
2nd. Elevation, to ½ inch scale.
3rd. Section, to ½ inch scale.
4th. Elevation of capitals on south side with 12 inches of the column and 18 inches of the arch, ¼ full size.
5th. Sections through arches and columns, ¼ full size.
6th. Drawings of the wrought iron work, ¼ full size.
7th. Drawing of one capital, full size.
8th. Drawing of wrought iron latch, full size.

All drawings to be addressed to Mr. S. G. Curry, *Mail* Buildings, Toronto, and to be sent on or before the 1st November, 1888.

Each competitor may submit less than the full number of drawings called for, but the decision will be made by allowing marks according to merit on each drawing, and any competitor omitting a drawing will lose the full marks allotted to that drawing. Marks will be allowed for neat and orderly arrangement of drawings on the sheets.

The competitor who receives the highest number of marks, will receive a prize, consisting of books to the value of $15.

The award will be made by a committee of the Architectural Guild.

THE QUEBEC SHIELD OF 1759.

J. M. LE MOINE, in his standard work on the old capital "Quebec Past and Present," thus describes the famous French shield, which the antiquarian researches of Mr. J. M. O'Leary, of Ottawa, have recently near thend:

THE JESUIT COLLEGE AT QUEBEC—1637-1878.

"On one of the city gates existing at Quebec in 1759 (probably the most fashionable and most used under French rule—Palace gate) was hung the trophy shown above. The shield, made of oak, measures 44 by 36 inches. The cleaning and varnishing have brought out the colors of the stones in the crown, as well as the gilding and color of the order of *Saint Esprit*, which surrounds the *Fleur de Lys*. The scroll is colored green, and the inscription is in gold letters on a black ground.

In a topographical description of Hastings, in Sussex, England, published in the *Gentleman's Magazine* for 1786, is found the first mention of the shield, in the following paragraph:

"The Town Hall over the market place, is a modern building, erected in 1700. In a frame hung up in it, is a long list of its mayors, the first of which was sworn as such in the year 1560, before which time a bailiff was the chief magistrate; the list commences in 1500. Near it the arms of France is fixed, largely carved on wood, and painted with proper colors, with embellishments, and was presented to the corporation by one of the officers (a jurat of Hastings,) who was at the reduction of Quebec, where it was fixed over one of the gates of that city, all of which is inscribed in a tablet under the arms."

In this same magazine for the year 1792 the following letters appear, bearing date the 20th January:

"The shield represented in plate III, figure 3, was taken from off one of the gates of Quebec in the year 1759, and was presented by General Murray to the corporation of Hastings. As this trophy commemorates so noble a conquest, and the inscription does honor to the General who made a present of it, the insertion of them in your magazine will oblige,

Yours, &c.,

"TILCONNENSIS."

"This shield was taken from off one of the gates of Quebec at the time that a conquest was made of that city by His Majesty's sea and land forces, in the memorable year 1759, under the commands of the Admirals Saunders and Holmes and the Generals Wolfe, Monckton, Townshend and Murray; which latter being appointed the first British Governor thereof, made a present of this trophy of war to this corporation, whereof he at that time was one of the jurats." ("Quebec Past and Present," pages 357-8.)

OUR ILLUSTRATIONS.

MONTCALM'S HEADQUARTERS AT BEAUPORT—1759.

THE old Seigniorial manor of the Duchesnay's at Beauport—the Marquis of Montcalm's headquarters, during the memorable siege of Quebec, in 1759, was until its destruction by fire in 1879, an object of unfailing interest to tourists visiting the famous falls of Montmorency, three miles to the east of it. Seigniorial stone manors in the Province of Quebec are getting scarcer every day. The ideas of modern comfort are ill suited for the inmates of these grim solid structures, with walls three feet thick, peaked gables and small grated windows, to protect them against Indian aggression in times bygone.

A circular plate of lead, much injured by fire, bearing an inscription, was found in its ruins in 1880; it contained some coins and the remnants of some documents which crumbled to dust when exposed to the air. The inscription, which gave rise to a lively antiquarian discussion, ran thus:

I. H. S. M. I. A.
LAN 1634 LE
NTE.
25 IVI LETIETE—PLA.
Premiere, P. C. Giffart.
Seigneur De. Ce. Liev.

The first line was made to read thus: "*Jesu hominum Salvatore, Maria immaculate auspice.*" Jesus the Saviour of men, under the auspices of Mary Immaculate.

The full particulars of this famous disquisition appear on pages 440-48 of "Picturesque Quebec." It seems to have been coeval with the first Seigneur of Beauport, surgeon Robert Giffard, who settled there in 1634, with his Perche le Norman colonists. Seigneur Juchereau (Duchesnay), its occupant in 1690, during the siege by Admiral Phipps, was ennobled by Louis XIV for his valiant defence of the place. For close on two hundred years the manor was occupied by the warlike Duchesnay family; a living descendant, the portly Lt.-Col. Theodore Duchesnay, Deputy Adjutant General of Militia at Quebec, was born there, as well as his sister, the late Madame Robert Le Moine, nee Emma Duchesnay.

The Duchesnay manor was sketched by the late Col. Benson Lossing, the historian of the American Revolution and of George Washington, and appeared in *Harper's Magazine* for January, 1859.

It was from this hoary tenement that the heroic General de Montcalm issued at six o'clock on the morning of the 13th September, to meet in deadly combat, his orthy foe, Major General James Wolfe, on the Plains of

Abraham, at Quebec, to decide the question of supremacy of leading two races on the continent of America.

THE JESUIT COLLEGE AT QUEBEC—1637-1878.

The vacant space between St. Anne and Fabrique streets, facing the Basilica to the west, represents the twelve *arpents* of land granted to the Jesuit Fathers in 1637, in the vicinity of Fort St. Louis, removed shortly after the conquest, and intended for the site of a college. As early as 1628, when Quebec contained but fifty souls, a sufficient sum to begin the structure had been tendered. A young nobleman from Picardy, in France, Rene de Robault, son of the Marquis de Gamache, before taking orders as a Jesuit, had requested his father, the Marquis, to hand over his patrimony, 16,000 *ecusdor*, or gold half crowns, to the missions of Canada. It was subsequently rebuilt about 1720. One year later than its foundation in 1638, John Harvard bequeathed £779. 17s. 2d. to support the college then recently founded by the Legislature of Massachusetts, near Boston, at Newtown, which that year changed its name into Cambridge.

The learned Order continued to teach the youth of Canada the higher branches of education until the suppression of the Order by His Holiness, the Pope, in 1764. In 1763 it held military stores and supplies. In 1765 Governor Murray, by proclamation dated 4th June, 1765, had it surveyed and appropriated as a barracks for the English soldiers. It was then styled the Jesuit Barracks, and continued as such until the Imperial garrison of Quebec was withdrawn in 1871. It was sufficiently large to accommodate 1,000 soldiers, and comprised an extensive court, where the regiment in barracks was paraded each day at 10 o'clock a. m., sharp. In 1878 the spirit of vandalism rampant at that time in the ancient capital, after making an unsuccessful attempt to demolish the cherished fortifications and heavy walls of our Gibraltar, spent some of its fury on this venerable former seat of learning. The antique pile succumbed at last to dynamite, much to the regret of the citizens.

It is fronted on four sides with a court in the interior as well as a chapel seen in the plate.

It is contemplated to plant the site with trees in lieu of the magnificent denziens of the forest under which the devoted missionaries used of yore to meet for prayer or meditation, and to add a fountain and a wide avenue for traffic. It forms part of the Jesuit estates.

OLD ST. JOHN'S GATE, QUEBEC, (INSIDE) IN 1854.

IROQUOIS HOTEL, ST. HILAIRE, QUE.—J. W. AND F. C. HOPKINS, ARCHITECTS, MONTREAL.

WHY DO PROFESSIONAL MEN SEEK SALARIED POSITIONS?

A RECENT item in a Boston daily calls attention to three architects, each of whom, it was said should be able to earn $5,000 in his business, yet one had just closed his office to accept a government position at $2,500, and the other two were candidates for $1,500 places on the state police. Doubtless similar instances could be found in the ranks of the engineers, and in either case there does not appear to be any adequate general reason.

There are, however, and always will be, men who are easily dissatisfied or discouraged. Such an one if he has no real love for his profession and no resolute determination to achieve success in it becomes quickly restless in the dull spells that almost invariably visit at some time the young practitioner, and resolving to secure something more definite in the way of income, he "seeks fresh fields and pastures new." This is perhaps no great loss to the profession, but it may sometimes happen that a young engineer or architect well qualified to do credit to his profession and himself is tempted by some temporary discouragement to give the whole thing up and try something else. This would be most unfortunate, for it is no less true in the world of business than in the sphere of which it was originally spoken that, "No man putting his hand to the plough and looking back" is fit for the rewards of success.

Ask those whose success you envy how they attained the positions you despair of reaching, and when you have learned what difficulties and discouragements they overcame, you may be ashamed to shrink from those which confront you.—*Engineering and Building Record.*

The well known Canadian sculptor, Mr. Phillippe Hebert, is at work on a bust of the late Sir George Cartier, and a vigorous sketch of a group of Indians for the Parliament Buildings at Ottawa.

The author of the design for a monument to be erected at Ottawa to the memory of the sharpshooters who fell in the northwest rebellion writes from England that the founders have obtained an excellent casting, and the work will shortly be shipped to this country.

AN ENQUIRY.

Editor CANADIAN ARCHITECT AND BUILDER:

DEAR SIR,—Referring to the illustrations in No. 5 of the CANADIAN ARCHITECT competition for a $2,500 Town House, I want to ask if the North side of the house is correct as shown in the illustration? If it is, why should not the dormer in roof and chimney shown on east side on plans and perspective also be shown on the north elevation?

Yours respectfully,
A. D. WASTE,
Student.

Toronto, Sept. 5, 1888.

[The north elevation as shown is perfectly correct. There is no reason why the chimney or dormer should or should not be shown. Some draughtsmen will show everything that is behind the picture plane, no matter how far back it may be—others will only show the features that are close up to it. There was nothing in these features which required to be shown for the purpose of explanation on the north elevation; if there had been, it would have been well to have shown them. Working drawings—by which we mean those which go into the hands of mechanics for their instruction—should be made as full and complete as possible; but drawings for the purpose of illustrating what is proposed to be done, may be treated very freely according to the whims of the draughtsmen.—THE EDITOR.]

About $150 worth of plans made by American Architects for Windsor buildings have been seized by the Windsor customs officer for non-payment of duty.

The American Institute of Architects will hold their twenty-second annual Convention at Buffalo on October 17th. An exhibition of architectural drawings will form a leading feature of the occasion.

To ensure the sending out of only students qualified

OLD ST. JOHN'S GATE, QUEBEC, (INSIDE) IN 1854.

by their preliminary training to take highest rank in their profession, the special two years course in architecture has been discontinued at Cornell University.

An Ottawa dispatch says: The resolution passed by the Dominion Trades and Labour Council at London, condemning the practice of Government officials competing against outside labour by doing work in their spare time, has more interest for this city than perhaps any other in the Dominion. Complaints have appeared in the press here time and again of the unfair interference with various callings occasioned by civil servants employing their abundant leisure in underbidding outsiders for work. This has been especially felt by engineers, architects and other draughtsmen. One case was cited where an architect had entered into competition for designs for the Toronto municipal buildings. It was alleged, over the signature of a reputable architect in this city, that this official competitor not only submitted designs, but also used the material of the department in which he is employed, and secured the assistance of fellow-employees in office hours for completing his work. Last session organized labor had a delegate at the capital watching legislation in its interest, and if the good practice is continued, he may be counted on to have light shed on these practices at the next sitting of Parliament.

The Rockwell Company proposes to furnish the town of Collingwood, Ont., with fifty natural gas lights, at $20 per light per year for a period of ten years. But suppose the natural gas supply should exhaust itself in less time than that?

It is announced that Hon. John Carling will shortly pay a visit of inspection to the quarantine stations. In view of the prevalence of small pox and yellow fever in certain districts in the United States, we hope that Mr. Carling will find every precaution being taken to guard against the entrance of these diseases into Canada.

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

SINCE my last report there has been a marked improvement in the building line as evinced by quite a stir among the architects here in preparing plans for new buildings to be contracted for immediately. So far as I can learn the new buildings will be mostly brick dwelling houses in rows of from two to six, two stories and basement, costing on an average about $1200 each, but there will be a few small detached villa residences which may cost from $3,000 to $4,000 each. These buildings have mostly been contemplated in the spring, and would probably not have been built this year were it not that the effects of the spring strikes are fading away, and the price of building materials is lower. This latter is always an inducement, especially for speculative building. As it is now hoped that the building unions will profit by past experience and let well enough alone, we may reasonably look for a busy fall trade with bright prospects for the spring, and as the same state of affairs no doubt exists in other cities in Ontario, the "Ambitious City" will not be alone in rejoicing over a revival that will ensure plenty of work to her resident mechanics, removing the necessity for them to seek employment elsewhere as has been the case during the past summer, and that foreign labor will not be again imported to take the place of men who were compelled to refuse to work by the authorities appointed to control their actions.

In my last report I mentioned that upon complaint having been made it was assured that the Building Inspector's books would in future be kept systematically and correct, but I regret to say that the last month's record shows very little improvement in this respect. No doubt some of the buildings that were commenced have been recorded, but not in the way required by the by-law, which stipulates under a penalty that before commencing any building in the city limits a description of such building, the locality, the name of the proprietor and the probable cost of erection, should be entered. This has not been done in a single instance. Merely the description or class of building is given with the locality, without even the proprietor's name, the entry generally being made by the contractor for the stone and brick work, who merely signs his own name. Until an example is made, and the penalty enforced, it is doubtful if our building record will ever be so full and useful as that of the city of Toronto, which is certaioly well and properly kept.

Here is the record for July as taken from the Inspector's book: Two brick dwelling houses on Bay st., Hammon; one brick dwelling house on Cherry st., James; one brick dwelling detached, Nelson, Ave., Hummill; one brick dwelliog detached, Markland st., Dufion; one brick dwelling house, Park, near Hunter, Martin; four brick dwelling houses, Carl Avenue, Nicholl; one brick cottage on Wilson st., Martin; three brick dwelling houses, Market st., Sullivan; one brick detached house, Markland st., T. Meade; one brick detached house, Main st., Moore; three brick dwelling houses, Napier, Gregg; two brick stores on King st., east, Balfour.

QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

MESSRS. J. M. Cassels & Co. have just commenced the construction of a leather store on St. Valier street, to which they will remove their business in December next, from their Crown street store. The new site being in the heart of the great boot and shoe factories will be found much more convenient for their customers. The new building will be 130 feet long, with a depth of 40 feet, and three stories in height, and brick walls, with white brick trimmings. The contractor is Mr. Charles A. O'Leary; the architect, Mr. H. Staveley.

Hon. G. Bresse is also adding to his already immense shoe factory by putting up a wing running out from the centre of present building. The architect employed is Mr. E. Tanquay.

The whole of the front of the old Durham terrace, now forming part of the famed Dufferin terrace, is being rebuilt in stone, with massive buttresses, the whole being done by day's work under the direction of Mr. C. A. O'Leary. The work will occupy the remainder of this season and most likely the whole of next season. The officers of the Board of Works superintend the work.

OWEN SOUND.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

THE following work has been let:—Two storey brick wing, with cut stone trimmings, to county buildings, for a gaol governor's residence, cost $2,000; Chas. Crothers, contractor. Block of two three storey brick stores for Mr. C. Hall, 44 ft. frontage x 94 feet deep, cost $350, contractors, Malcolm & Green. Additions to store for W. B. Stephens, 30x27, one storey brick with cut stone front, cost, $1,000; contractors, Malcolm & Green. Two storey addition to store, brick, for J. M. Kelbourn, 24x38, cost $863; contractors, brick, W. H. Sinclair; carpenter, W. A. Green. Additions to residence of C. Eaton; day work; estimated cost, $1,000. Brick residence for Mr. J. M. Wilson, two stories, flat roof, size, 34 feet front by 40 feet deep, estimated cost $1,500. Additions, etc, to Hill street school premises, let to A. Wilson, contract, $533. Brick residence for Mr. Middlebro, two storey, cost $1,700.

The building trade here is fairly brisk in all its branches, and if all that is now contemplated goes on, will last late into the fall, or winter.

Plans being prepared for several small dwellings which will be estimated on later.

DESTRUCTIVE AGENCIES IN ENGINEERING STRUCTURES.

ALL structures, no matter of what material, are subject to physical and chemical agents which tend to destroy them from the very moment of their erection. In steel and iron we have materials in many respects so far superior to the stone or wood of former days that structures, such as bridges, ships, etc., built nowa-days would, using the old material, have been plain impossibilities; still the forces alluded to above are present and do their work.

An iron or steel structure left to itself, without care, and hence more sensitive to the action of these forces, will be, in an incredibly short time, destroyed or rendered dangerous or useless. With proper care, however, they may on the other hand, last for generations. The duty of the engineer and architect is, therefore, not only to secure strength and form, but also to so arrange, combine and protect the material, that the effects of the forces referred to hereafter will be counteracted, checked, or neutralized.

The more common causes of decay and destruction are vibration, corrosion and galvanic action. The first of these does not fall within the limit of this article, but may occasionally be referred to. Galvanic action may set in from different causes. For instance badly arranged materials of different kinds, various degrees of hardness; as a consequence of corrosion setting up a galvanic couple; presence of a conducting fluid between different metals, and as a result of riveting, hammering, etc.

Corrosion will follow as a result of exposure of the material to the different influences of the atmosphere, or to that of water, either fresh or salt; or to the presence of certain gases, or carbon, or to the difference in the chemical constitution of the metal, lack of homogeneity, the presence of combined air and carbonic acid in water, partial or total exposure, from variations in temperature, non-uniformity in the cooling of steel, the material being exposed to conditions of wet and dry alternately, the presence of free oxygen in water, galvanic action and from various other causes.

The vibrations referred to, although they are common to all structures, do not become dangerous so long as the structures are properly designed; and inasmuch as there is no practical danger before the rigidity of the work is threatened, and as such a danger cannot very well arise if the scantlings are duly proportioned and properly connected, these questions naturally belong to the construction and not to the protection of the structure. If the stresses are sufficient in intensity to produce distortion in the material beyond the elastic limit, then the danger commences, as in such a case the crystalline arrangement in the metal will be affected, that is, an alteration will take place in the crystalline axis."

Corrosion and galvanic action are so intimately connected that it may be wise to consider these two forces as tending toward the same results.

The corrosion of steel and iron is different in air, in water, and when in contact with foreign bodies, and the acceleration of the corrosion is also different in each case under different circumstances. Different metals suffer different losses under the same conditions. The loss in weight per month per square foot of surface in pounds in salt water is:—for steel, 0.0216; iron, 0.0203; zinc, 0.0069; copper, 0.0061. The corrosion will increase if the metal is in contact with certain foreign substances, as, for example, iron in contact with brass and submerged in salt water will lose 3.42, with copper 4.95, with lead 5.50, and with tin 8.60; the corroison of iron by itself being taken as 1.000. Metals containing this or similar substances will of course tend to accelerate the corrosion of iron relatively. Some alloys are however, more powerful than their components.

It is said that fresh water corrodes wrought iron more rapidly than cast, but the reverse seems to be the case in salt water. The corrosion increases somewhat with the carbon, and steel should, therefore, under precisely the same circumstances, suffer a trifle more than iron. Salt water will transform cast iron into a plumbaginous substance in a very short time if not effectively protected, and cast iron pipes laid under ground near the sea where the earth is salt have been found to be destroyed in an extremely short period. White or light grey castings stand this destruction much better than do dark castings. Iron, as well as wood, seems to suffer most if the metal is alternately exposed to water and air, the cause of this, as far as the metal is concerned, is undoubtedly due to the fact, that in such a case there will be a greater percentage of carbonic acid mixed with air present, and also because the material is partly acted upon by the water and partly by the wind, both accelerating the circulation. As a preventative against corrosion of iron laid in salt water or even in the air, pure coal tar is very commonly used; the metal is heated and then coated with the tar. Pure asphalt and common Swedish tar are also employed. The corrosion of iron in common water is mostly due to the presence of dissolved air and carbonic acid, the acid forming spots on the metal which presently become more oxidized by the effect of the air and decomposed water; the proto-carbonate acting as a medium, the whole surface will soon be covered, and as the metal is electro-positive to its own oxide a voltaic couple is set up between the first formed sesquioxide and the, as yet, unaffected surface, spreading the disease with a force inversely as the square of the distance from the first affected spot.—*American Engineer.*

Mr. H. N. Willoughby, of Carleton Place, has secured the contract for the new Town Hall at Arnprior, Ont., of which A. W. Bell, of Almonte, was the architect. When finished this will be one of the handsomest public buildings in the Ottawa Valley.

It has been ruled that if a builder's work is improperly executed, and the employer can show there has been no beneficial service, he can deduct or bring a cross action. Liability depends entirely on the evidence that can be brought to show that the orders of the architects were not obeyed.

An English woman who has noticed the inconvenience to which men attending the theatres are in the habit of putting themselves and other people by going out between acts, makes the suggestion that theatre seats should be so constructed that they could be sunk through a trap in the floor into a saloon below.

MURAL DECORATION AT THE CAPITOL.

AN interesting account of the decorations on the walls of the Senate has recently been published in the Washington *Star*. It pointed out that down in the basement of the Senate the walls are the most elaborately decorated of any in the Capitol. The restaurant, the barber shop, the stationary room and the less desirable committee rooms are on that floor. The walls in other parts of the building are frescoed more sparingly and in larger design. But these are deep-toned and present a panorama of fine paintings. The figures are nearly all small, and they enver almost like mosaic work the walls and arched ceilings. Over some of the doorways there are large figures, and here and there are panels representing small busts of distinguished statesmen, as Washington, Franklin, Webster, Marshall and Clay. But the greater part of the painting represents birds of varied plumage, and here and there a native animal. Then there are other birds not familiar to these parts. Passing through the corridors one is surrounded by an ornithological carnival. A fine scroll forms a sort of frame-work of relief. Interspersed throughout the design are bunches and sprays of native plants and flowers, and here and there a snake common to this clime coils his way up among the scroll-work. Chipmunks, squirrels, common field mice, flying-squirrels, beavers, mole, weasel and other animals appear in natural attitudes. Clusters of grapes, cherries, plums, peaches pears and other native fruits, with here and there an ear of Indian corn, complete the design.

The work was begun about ten years before the war. Brumidi and a number of other famous frescoe artists were engaged upon the work. When the war broke out the heavy appropriations had to be stopped, and the work intended for the whole capitol, as outlined by the work on the walls of the Senate basement, virtually abandoned. Since the war no one has had the courage to propose an appropriation to carry out the original design.

At present there is being nothing done with the belt of historic frieze work in the rotunda. Costagini, the artist, has been in Philadelphia for some time, and it will be several weeks before he resumes his work in Washington. It is proposed now to erase one of the panels that has been completed and substitute for it another subject. The objectionable panel represents the death of Tecumseh.—*Building.*

FLOWERS ON PANELS.

FLOWERS will always be prominent as subjects of decoration, conventionalized or otherwise. They suitably fill both regular and irregular spaces, separately or in groups, ordinarily with leaves and stems. They also admit of high or low toned colors, of flat or shaded treatment. All the technical skill the painter possesses may be turned to account in their portrayal. Of late they have been extensively used for the adornment of door panels, all the more attractive when each panel presents different groups of flowers.

Much of the success of decorative flower painting depends on their artistic grouping, which includes the avoidance of overcrowding or confusing one flower with another. Every flower should be defined with sufficient exactness to enable the spectator to tell at a glance what it is. It is always a safe plan to group the light colored flowers on one side and the dark ones on the other. The effect of roundness may thus be got with color even in a flat treatment.

Pricking and pouncing and then painting in the flowers, ornaments, etc., is the method a highly skilled painter would adopt, because it would afford him the opportunity as he went on of exercising his fancy by putting in here and there a flower, bud or leaf just as he pleased, not being restricted to working within the lines of the original design. To a skilled flower painter this is one of the great charms of the work. But for flat treatment and outlining afterwards a stencil is the most widely useful.

Flowers are of course susceptible of a variety of treatment. They may be worked at times with advantage in gold, with a black outline, on a golden brown or citron ground in conjunction with other low-toned colors, or an azure or sky blue ground made from white, ultramarine and blue, with a little white, added. The flowers may also be painted and shaded in their natural colors without outlining, the corner ornaments or vases being in subdued pinks, greens, grays and yellows. The method in which there is the least danger of failure is the flat treatment with outline, excellent grounds being a dull cream or yellow or Indian red with ultramarine added to give it a rich bloom. In naming these grounds we assume that care will be taken that the colors selected to be placed on them will be harmonious. The finishing of the flowers in flat tints does not preclude the putting in of the different colors of their several parts. Good effects too may often be attained by painting even brilliant flowers in low toned hues, using only two or three shades of the same color or even only using one color for the general surface and outlining and putting in the detail with another color. The stencil pattern need only be outlined when stencilled in one color. Well selected neutral colors with a black outline on a dark ground always look rich and good. Where vases and ornaments are introduced these will look well gilded and outlined in black; in such case the clustered flowers will be improved if touched up with gold. As most ordinary doors have two top and two bottom panels of different sizes, some difficulty is apt to be encountered in so arranging the designs for all that they will approximate in general form.

The majority of the stencil brushes should be small. Small pieces of papers may be used to prevent one color encroaching on another, the paper being held with one hand. Two larger sired stencil brushes for blending or gradating two colors one with another will be required: a clean piece of deal board should be on hand to dab the stencil brush on after it is charged with color, which takes off the superfluous color that might otherwise when working produce ragged edges. To ensure sharp good work it is always safest to use an almost dry brush, and spend the time in carefully dabbing or rubbing the color on, instead of working with a brush full of color.

The painting of flowers and leaves in two shades of the same color, the shadowed side comparatively dark as compared with the light, will produce an appearance of roundness without departing from the flat treatment.

We would suggest as an excellent selection for the panels of a door the flowers emblematic of Spring, Summer and Autumn, Winter being represented, in place of flowers, by the ivy, the misletoe with its berries, the holly, ruddy hips and haws, grasses and ferns. Vases, if any, should be introduced only on the lower panels. On any additional small panels at top fancitul subjects might be introducud.—*Painters' Magazine.*

The use of white lead in the composition of floor paints is to be avoided, as it softens the wood. Ocher, raw umber and sienna are not injurious. The best finish for a floor which is to be much used is oil and wax, or a composition into which each of these ingredients enter.

The following is regarded as a good receipt for a floor varnish: Place 10 pounds of linseed oil in a pan, heat it to 300°, stirring it meanwhile. Mix with it, little by little, two pounds of pure white borate of manganese, finely powdered. Now head 100 pounds of linseed oil in a boiler until it is ready to boil over, pour in the former compound and boil together for twenty minutes. Then filter the mixture through cotton cloth, and apply one or two coats as desired, and a final coat of shellac if an extra polish is wanted.

The London *Oil and Colorman's Journal* furnishes the following method of preparing a valuable varnish known as milk of wax: Melt in a porcelain capsule a certain quantity of white wax, and add to it while in fusion an equal quantity of spirits of wine, of sp. gr. 0 830; stir the mixture and pour it upon a large porphyry slab. The granular mass is to be converted into a paste by the muller, with the addition from time to time of a little alcohol, and as soon as it appears to be smooth and homogeneous water is to be introduced in small quantities successively, to the amount of four times the weight of the wax. The emulsion is to be then passed through canvass in order to separate such particles as may be imperfectly incorporated. The milk of wax thus prepared may be spread with a smooth brush upon the surface of the painting, allowed to dry and then fused by passing a hot iron (salamander) over its surface. When cold, it is to be rubbed with a linen cloth to bring out the lustre. It is to the unchangeable quality of an encaustic of this nature that the ancient paintings on the walls of Herculaneum and Pompeii owe their freshness at the present day.

We have heard rumors to the effect that ex-Mayor Howland and several other Toronto gentlemen are considering the scheme of incorporating a joint stock company with large capital with the object of tendering for the construction of large buildings in Canada.

SOME POINTS ON SEWERAGE, WATER SUPPLY, AND THE CONSTRUCTION OF A HEALTHY HOUSE IN A COUNTRY TOWN.

By David B. Dick, Architect.

BEING confronted the other day with a bill for what seemed to be a large amount for emptying an ancient pit on the site of a new building, I remarked to the excavator that it must have been a very large pit to have held so much. He replied that the quantity of stuff usually taken out of a pit did not depend so much upon its size as upon the way in which it was constructed. The remark was suggestive. If, of two pits that under similar circumstances might be expected to contain the same quantity, one is found to have in it a much smaller quantity than the other, the question would naturally suggest itself, "what has become of the surplus?" An examination of the nature of the materials and method of construction of the two pits would probably result in the discovery that one was water tight while the other was not; or more probably that one was less leaky than the other.

It is an old saying, "Out of nothing, nothing is expected to be got," ("*Ex nihilo, nihil fit.*") But in the construction of the leaky cesspool, a good deal has been put in and still very little taken out. What then has become of it? Ask the physicians in the neighborhood where they have been called upon to attend cases of typhoid, intermittent fever and diphtheria, then follow up the clue thus obtained and there will probably be very little difficulty in discovering where some of it at least has gone. Chemical analysis of the drinking water in the wells or springs from which the supply was obtained for the houses in which the patients lived, will probably change a strong suspicion into a positive certainty, and further investigation will ascertain the channels through which the missing portion of the contents of the cesspool has found its way into the sources of water supply. The idea is too abominable to be willingly accepted as a proved matter of fact. Very likely the sceptic will assert that the natural and proper method of disposing of excreta is to return it to the soil, and probably he will quote Scripture in support of his position, adducing the command given to the Jew, to have a paddle on the end of his weapon to aid him in accomplishing that desirable end. And, in fact, the contention is true, and therefore the premises are perfectly correct, but the conclusion drawn from them is utterly wrong.

It is true that the excreta should be returned to the soil but there is a right way of doing this, which is safe, and a wrong way, which is highly dangerous. The safe way and the rational way is to spread the stuff on the surface of the ground or convey it into the soil at such a distance below the surface that the roots of the growing plants will seize hold of the poisonous matter and by the skillful chemistry of nature convert it into plant nutriment, and so into healthful food for man and beast. The wrong and dangerous way is to dilute the excreta until it liquidizes and then allow it to soak away down far below the plant roots until the ground is saturated down to the level of the ground water, when the liquid flows away with the natural underground streams which feed the wells and springs. It is out of sight and out of mind until the investigations of the physician compel the most sceptical to see that as effect invariably follows cause, so sickness invariably results from the use of water which has been thus poisoned. It is true every one who uses the water does not fall ill of malignant fever, just as it is true that a certain quantity of poison may be taken with impunity and the constitution may even be habituated to its use. But it is also true that the dose of poison which a strong healthy person might take with impunity, would be sufficient to kill a weakly person. And so with the contaminated water, the robust person whose constitution is able to resist the effects may use it for a time without apparent evil results, while those of enfeebled condition may succumb to it at once.

This question of the best methods of safely, if not profitably, disposing of waste water, is one which every community has to face, and the more rapid the growth of the community, the more urgent becomes the need to find a satisfactory answer to it. On the sea coast, it is seldom thought necessary to consider any further than the best means of conveying it to the sea. If carried out to deep water at some point where the currents will carry it out to sea and not throw it back on the shore, this is probably as safe a method of disposing of it as any. It is certainly unprofitable, but that must apparently always be a matter of secondary importance in the consideration of this question. The first and most important thing is to prevent it from becoming a source of danger to health. Inland towns, however, have not this ready means of getting out of the difficulty. It may be said without hesitation, that it is unsafe to throw sewage into any running stream. If the town which throws it in does not suffer, those that are lower down must be sacrificed. Many a once clear and beautiful trout stream has been turned into a current of abomination in which even the coarsest fish could not live. Neither is it safe to throw it into a fresh water lake, however large. Having no tide, there is seldom current enough to carry the stuff away without polluting the water for a considerable distance from the mouths of the sewers. This plan is rendered still more objectionable by the fact that the supply of what is supposed to be pure water is usually drawn from the very lake into which the sewage is poured. This is indeed to do deliberately what is so often done unintentionally in the case of the leaky cesspool, in the hope that, if sufficiently diluted, even sewage may become a harmless beverage. The fallacious nature of the hope has been so often proved, that probably no municipal body would now deliberately inaugurate such a system in a new place. The people of many towns are almost at their wits' end to know how to undo the evil which has thus been brought upon them by the ignorance or carelessness of their predecessors.

Many growing inland towns have now reached a stage at which the question must be faced. They have gone on as long as they dare go on with the old plan of cesspools and wells, and while the authorities are sometimes sadly puzzled to know what they ought to do, they are in this happy position that they can begin at the beginning and inaugurate a proper system without being handicapped by the presence of an old and insufficient system which is incapable of improvement, but in which so much money has been sunk that any proposal to abandon it is sure to arouse a storm of opposition. It may be safely asserted that there is no town or village in the country thus situated for which competent engineering skill cannot devise a safe and suitable system of water supply and sewerage. The two things necessarily go together. Either one without the other is almost useless. If one only is provided, the need for the other is soon so strongly felt that it also must be supplied. When water works only are introduced, the people will not long be content to draw water from a street hydrant, and so soon as the water is introduced into the houses, the necessity for a drain becomes apparent.

Whether the system of dry earth or water carriage for the removal of excreta be adopted, the necessity for a system of drains remains the same, because the quantity of water used for washing and other necessary purposes is so great that no dry earth system can deal with it. It has also to be borne in mind that even when solid matter is got rid of by the dry earth system, the liquid waste remains, and, if not carried away before decomposition begins, is just as much a source of danger as the other. As regards garbage, such as refuse vegetable matter, there is only one safe way of dealing with it, and that is to burn it. By the exercise of a little care and good management, this may be done in every kitchen in the ordinary stove without burning an additional ounce of fuel, and at such times as not to interfere with the use of the fire for any domestic purposes. It is only necessary to keep the garbage in a vessel on the back of the stove for a few hours when it will become dry enough to burn readily.

The dry earth system may be advantageously used whenever there is a bit of land to be cultivated, and when thus used, it may even become profitable, because the used earth can be kept in any dry place until it is wanted. Every one is familiar nowadays with the dry earth system in some form or other. It consists simply in deodorizing the excreta by covering it with a little dry loam or other suitable material. In most cases, however, where a complete system of sewerage is laid, it is preferable that the solid matter of sewerage proper should be disposed of in the same way. The subject of the best method of the disposal of sewage is too large a one to be entered upon here. It may, however, be said in passing, that the small pipe system with the storm water excluded, used in connection with a sewage farm, or at least a piece of ground properly prepared for filteration, will probably be found to be the most suitable for most small inland towns.

Many people have an idea that they may have as many baths, wash basins, and sinks in a house as they like, and that these cannot be a source of danger so long as there is no water closet. There cannot be a greater mistake. One fixture is just as safe as another if properly connected with the drains; and, on the other hand, the most innocent looking fixture, even if it is only intended to take away the drip from the drinking fountain in a public reading room, is just as much a source of danger as a w. c., if it is not properly constructed and connected.

The end of good plumbing is to provide a means of conveying soil into the sewers without allowing any air from the drains or soil pipes to pass into the building either through the fixtures or through leaks in the pipes. Any plumbing that does this and is strong enough to continue to do it permanently under fair usage, is good plumbing. Any plumbing which fails in any of these points, is bad plumbing. Good plumbing cannot be done cheaply. The multiplication of fixtures beyond the limit of actual necessity becomes a luxury, therefore, when it is proposed to introduce plumbing into a house, not a single fixture should be put in more than can be good of its kind and fitted up with the best of workmanship. The ruin of good workmanship in plumbing as in every other kind of handicraft, is the dictum so many people lay down that they are determined to have a certain number of fixtures or what not, but that they will only pay so much for them. There can be no greater folly. The sensible way of going about the matter is to consider how many fixtures it is desirable to have, and then put them in, if there is money enough to make a first-class piece of work. If not, then reduce the number to that which the available funds will warrant.

Within the last few years there has been a radical change in the principle of plumbing. Formerly the idea prevailed that sewer gas could be bottled up in the soil pipes and yet not find its way into the house. Plumbing fixtures were scattered all over a house wherever convenience or fancy dictated. Tile pipe drains were run underneath the floors to every fixture or soil pipe. These drains were seldom water-tight at the joints. The soil leaked out and saturated the ground underneath the house, where it decomposed and gave off poisonous gases, which were sucked up through every crevice in the floor boards and behind the skirting and wainscotting whenever a fire was burning in the house. A fire cannot burn unless it is supplied with air, and it will suck air from every chink so long as it continues to burn, for if the room were air-tight, the fire would go out. This source of danger was seldom thought of, and sometimes it was intensified by building a drain of brickwork many times larger than was necessary. If the tile pipes were seldom tight, it is safe to say that the brick drains never were. They were also too large to be self cleansing, that is to say, the small quantity of water flowing along the bottom had not force enough to sweep away the soil, which collected in the bottom as in an elongated cesspool, breeding pestilential vapours as dangerous as those of the street sewer.

(TO BE CONTINUED.)

* Paper read by David B. Dick, Architect, Toronto, at the Convention of Executive Health Officers of Ontario, at Lindsay, Ont., August 14th, 1888.

FIGURES OF THE TOWER BRIDGE.

THE following technical description of the new bridge, which is rising east of the city under the direction of the corporation, and comparison with London Bridge, will interest, we believe a considerable portion of our readers: Total length of bridge, 940 feet; total length of bridge and approaches, 2,640 feet; opening span width, 200 feet; opening span headway, when opened, 135 feet; opening span, headway, when shut, 29 feet 6 inches; side spans, width, 270 feet; side spans, headway, from 20 feet to 27 feet; width between parapets, opening span, 50 feet; width between parapets, side spans and approaches, 60 feet; steepest gradient of approaches, 1 in 40, (steepest gradient of approaches of London Bridge, 1 in 7;) depth of foundations, 60 feet below Trinity high water mark, 27 feet below bed of river; sectional area of waterway, 20,040 square feet, (London bridge, 19,300 square feet;) depth of water in opening span at high water, 33 feet 6 inches; depth of water in opening span at low water, 13 feet 6 inches. Estimated quantities of materials in the bridge and approaches—Bricks, 31,000,000; concrete, 70,500 cubic yards; cement, 19,500 tons; granite and other stone, 235,000 cubic feet; iron and steel, 10,500 tons. Machinery, etc.—Two steam pumping engines for hydraulic machinery, each 360 horse power, eight large hydraulic engines and six accumulators, for hydraulic lifts in towers for passengers; size of each leaf of opening span, 50 feet wide by one 100 feet long; weight of each leaf of opening span, including roadway and counterbalance weights, 700 tons; estimated cost, £750,900.—*The London City Press.*

Messrs. Patterson & Hall have just completed and put in operation at Midland, Ont., what is claimed to be the most complete planing mill in the Dominion. The machinery consists of a double cylinder lightning matcher, capacity from twenty to thirty thousand per day; No. 0 sticker, capacity 10,000 lineal feet per day; 26 inch double surfaces, capacity 40,000 feet; re-sawer, and gang rip, capacity 20,000. Power is supplied by a 45 h. p. engine, and 45 h. p. steel boiler. The mill is supplied with the best modern labor-saving and fire protection devices. It is the intention to supply the Ontario market with every description of dressed lumber, mouldings, etc.

CANADIAN PORTLAND CEMENT.

REFERRING to a notice which appeared in our columns a few weeks ago, of a large deposit of carbonate of lime and clay suitable for the manufacture of Portland cement, which was found in the County of Grey, a few miles from Owen Sound, we are informed that Mr. Wm. Robinson, C. E., of Owen Sound, has visited Europe with a view of more thoroughly testing the quality of cement produced from this deposit, and comparing it with that of English manufacture. After two month's absence he has returned highly pleased with the results of the several tests made with this cement in Europe. The tensile strength of the cement produced in the test kiln by Mr. R. J. Doyle, Owen Sound, the owner of the deposit, and tested in the laboratory of Mr. Frederick Ransome, C. E., London, Eng., was very high, registering 675 lbs. per square inch at 7 days setting, the average of all the tests being 540 lbs. per square inch. The English Government standard is 350 lbs.

Mr. Robioson in examining the records of the Society of Civil Engineers and Architects in England, found the average strength of cement of English manufacture to be 391 lbs. at seven days setting.

The general tests made by Mr. Robioson in England with English and French Engineers, show our native material to be capable of making cement of even higher grade than the average European Portland cement, there being only three tests in Europe which have exceeded in strength that burned in Mr. Doyle's kiln.

The Company have already commenced excavations for the erection of buildings capable of manufacturing about 400 bbls. per day, and expect to be in full operation by May, 1889. This we understand will be the first Portland cement factory on the American continent.

WIRE LATHING.

A TEST was recently made at Hamilton, Ont., of a new kind of wire lathing, the invention of Messrs. B. Greening & Co., manufacturers of wire work. The inventors simply propose to substitute for lathing a sort of wire screen. This is fastened to strips of crimped iron. The strips are an inch wide, and when fastened to the joists edgeways they keep the screen and plaster an inch from the wood, and render the walls fire-proof. The new material and method was subjected to intense heat over a furnace without cracking the plaster or scorching a joist placed an inch above the plaster. The new material will be manufactured by the Greening Co.

Messrs. Greening & Co. had a sample of their invention at the Toronto Exhibition, where it attracted much attention.

WHAT PIPES ARE USED FOR.

THE increasing requirements of modern civilization, says the *Scientific American*, are well illustrated by the extent and variety of underground pipe systems now employed in large cities. Thus there are in actual operation: Pipes for conveying and delivering illuminating gas. Pipes for conveying and delivering fuel gas. Pipes for conveying and delivering drinking-water, and for fire purposes. Pipes for conveying salt water for street sprinkling and for fire purposes. Pipes for draining and carrying off sewage and surface water. Pipes for delivering hot water under high pressure, for heating purposes and power. Pipes for delivering cold water under high pressure for power. Pipes for delivering live steam under pressure, for heating purposes and power. Pipes for delivering compressed air, for purposes of power and ventilation. Pipes for producing power where required, by vacuum or suction, and for ventilation. Pipes for conveying letters and packages, by compressed air and by vacuum. Pipes for regulating clocks, by compressed air. Pipes for conveying mineral oils Pipes for electrical wires for electric lighting, electric railways, telephones and telegraphy. And pipes for power ropes for driving machinery and moving street-railway cars.

Messrs. Close, Falconer & Close, of Woodstock, Ont., are making square flat tiles for sidewalks.

The plant of the Barnum Wire and Iron Works is being removed from Windsor to their new factory at Walkerville, Ont.

While at the office of Messrs. Close, Falconer & Close, brickmakers, a few days ago, says the Woodstock, Ont., *Times*, we were shown several samples of bricks made in various parts of the world. Among the lot was a most interesting relic of olden times, a brick made in Holland in 1699, nearly two hundred years ago. It was used in the construction of a building near New York, at one time the headquarters of General George Washington. It is much smaller than the bricks now made, but it is far superior; the bright red clay of which it is composed is almost as hard as stone.

BRICKLAYING IN FROSTY WEATHER.

CANADIAN builders will be interested in some statements recently made on the above interesting subject by Messrs. Agnew and Hennessey to a reporter of the St. Paul *Pioneer Press*. Both Mr. Agnew and Mr. Hennessey are veteran builders with considerable experience in the conduct of brickwork after the commencement of freezing weather. They completed the upper part of the St. Paul *Globe* Building during December while the mercury ranged from +15° to × 15°, and consider that part of the wall as sound as any in the city. Mr. Agnew stated that they used salamanders, slaked the lime with hot water, and heated the bricks and laid them in hot mortar and good adhesion was secured. He said that a man could lay only about half as many bricks per diem in cold as in warm weather, and that a thaw during its erection would be injurious to a wall built in winter weather, but that continuous freezing was not at all injurious for bricklaying or plastering. Alternate freezing and thawing he considered likely to burst and crumble the mortar, and objected to building stone foundations during freezing weather.

CANAL LOCKS.

THE depth of a lock must be such that a barge navigating the lower section can float freely into it when the sluice-gates are closed and the flood-gates open, and the height of the flood-gates must be such that when closed, and the water admitted into the lock from the upper level, it shall not overflow them. The position of a lock is just at the termination of a level where the ground begins to fall. It is for every reason desirable to construct a lock of masonry so that the wash of the water caused by opening the sluices, shall not augment its capacity. Sometimes when the traffic is heavy, as upon the Regent's Canal, in London, the locks are made double—that is, side by side, separated by a strong pier of masonry—and a flood-gate or valve is placed in this pier, by which communication can be made between the two locks. By this arrangement a saving of water is frequently effected, as instead of allowing an entire locktul of water to pass into the lower section, half of it can be passed into the adjoining lock, should that happen to be empty at the time. Great care is needed in constructing the retaining walls and piers of locks. As a rule, the thickness of a wall intended to support the lateral pressure of water should not be less than half the height of the water which presses against it. The surface of the masonry should be set in cement, and the bonding should be arranged so as best to withstand the thrust of the closed gates.—From *Cassell's Technical Educator* for September.

It has been found that four inches of contact with, or overlapping on, supports, give to beams their greatest strength and firmness.

We observe that Messrs. Isaac Usher & Son, of Thorold, secured the silver medal offered by the Toronto Industrial Exhibition Association for best sample of cement.

The strength of beams is in direct proportion to their thickness, inversely as their length, and as the squares of their depth, thus: A joist four inches thick is twice as strong as a two-inch joist; if twelve feet in length it has double the strength of one of twenty-four feet, while doubling the depth, as from six to twelve inches, increases the strength fourfold. It is assumed of course that all other elements of strength are equal in each instance of comparison.

A new hot water heater, the invention of Mr. Edward Gurney, has just been placed on the market by the E. & C. Gurney Company, of Toronto. In our advertising pages the manufacturers show illustrations of the new device, for which they claim many points of superiority as compared with heaters heretofore in use. The limited space at our command prevents a full description of this new heater in this number, but full information will be cheerfully supplied by the manufacturers.

Messrs. F. P. Currie, W. McNally, A. Bremner and Wm. Currie, of Ottawa, and others, are applying for incorporation for the "Beaver Drain Pipe Company of Montreal," with a capital of $100,000, for the manufacture and sale of drain pipes and all fire clay goods, and building bricks, etc. A site has been selected in the vicinity of the city, and the business is to be conducted on a large scale, one of the interested parties being at present in Scotland purchasing the most modern machinery for the conduct of the business.

A Tonawanda, N. Y., inventor, Frank Batt, has just received a patent for a trimming machine, designed to make dimension and fancy butt shingles at such a rate that they will not cost much more than the ordinary sort, which have to be taken with rough, square ends, and of such widths as the maker may happen to turn out. Inventive genius has been laboring with this problem since dimension shingles came into general use, and it has several times been said that the great desideratum in this line has been found. One Pacific coast inventor was mentioned in the papers a while ago as having devised a machine that would take in ordinary shingles at one end and turn them out at the other dressed and shaded and pointed in any way desired. With all this success it would seem that a fancy shingle roof ought soon to be within reach of every farmer in the country.—*Lumber.*

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

FERGUS, ONT.—A system of waterworks is being considered here.

PICTON, ONT.—A by-law has been carried voting $30,000 for waterworks.

PRINCETON.—A new Roman Catholic church to cost $6,000 is to be built here.

VICTORIA, B. C.—The Presbyterians will erect a new church at a cost of $40,000.

PORT ELGIN, ONT.—Tenders are asked for the erection of a new public school building.

STRATHROY, ONT.—Messrs. Bixell & Son ask tenders for the erection of a lager beer brewery.

ST. LAMBERT, QUE.—Plans have been made by J. M. Walbank for a sewerage system.

TEESWATER, ONT.—A by-law to raise $9,000 for a system of waterworks will be submitted.

DESERONTO, ONT.—Changes are to be made in the method of lighting the Presbyterian church.

REGINA, N. W. T.—Tenders will be asked for the construction of a new drill shed to cost $30,000.

SHELBURNE, ONT.—A majority of twenty-four carried the by-law for $12,000 for waterworks recently.

MERRITTON, ONT.—A by-law granting $10,000 to extend the waterworks system has been carried.

INGERSOLL, ONT.—The town has decided to have a system of water works, and an electric light plant.

TORONTO, ONT.—The Council has decided to purchase additional plant for the high level pumping station.

BELLEVILLE, ONT.—Funds are being raised by subscription towards the erection of a new armory and drill shed.

HALIFAX, N. S.—An inspection of the water works is to be made with a view to their enlargement and improvement.

KINGSTON, ONT.—The Government has made an appropriation and selected a site for a dry-dock to cost about $500,000.

ST. THOMAS, ONT.—The trustees and congregation of the Central Methodist church will erect a new edifice to seat 1200.

MONTREAL, QUE.—Four new warehouses are to be constructed at Hochelaga, to accommodate the increased lumber and coal trade.

ST. HENRI, QUE.—The city council has adopted the by-law providing for the construction of sewers, as well as that authorizing the issue of $100,000 debentures.

STRATFORD, ONT.—It has been decided to build a new fire hall the cost not to exceed, $3,500.—The City Council have decided that the City Hall shall be heated by steam.

OTTAWA, ONT.—Mr. Hamel, C. E., will report to the Public Works Department on the feasibility of constructing a bridge across the Ottawa, below the Deschenes rapids.

OWEN SOUND, ONT.—Preliminary sketches are under way for a three storey hotel, 105 feet frontage, brick, with stone trimmings, complete with all modern improvements. Also for a few brick dwellings costing from $1,500 to $1,800.

GODERICH, ONT.—Tenders are called for the erection of the new post office, customs house and inland revenue office here, the plans and specifications for which are on view at the clerk's office.—This town will adopt the electric light.

A coating of ships feet, coal tar, pitch and batten is said to constitute a most successful preventative against the ravages of the teredo on piles.

The Board of Works of London, Ont., has inaugurated an era of doubtful economy by recommending that the river bank be lined with tin shavings as a substitute for a breakwater.

Geo. M. Pullman, of palace car fame, is erecting himself a granite palace home on one of the Thousand Islands in the St. Lawrence. The money has generously been contributed by citizens of the United States in small sums, collected by porters.—*Lowell Journal,*

A German trade journal advocates the following method for testing the quality of roof slates: The samples of the slate to be tested should be carefully weighed, and then put into boiling water for a quarter of an hour. The water must, however, be fairly free from lime, saltpetre and ammonia. The slates are then re-weighed and those that show the greatest increase in weight are those most capable of resisting deterioration.

St. Lawrence Canals.

NOTICE TO CONTRACTORS.

SEALED TENDERS, addressed to the undersigned and endorsed "Tenders for the St. Lawrence Canals," will be received at this office until the arrival of the eastern and western mails on TUESDAY, the 25th day of September next, for the construction of two locks and the deepening and enlargement of the upper entrance of the Galops Canal. And for the deepening and enlargement of the summit level of the Cornwall Canal. The construction of a new lock at each of the three interior lock stations on the Cornwall Canal between the town of Cornwall and Maple grove; the deepening and widening the channel way of the canal; construction of bridges, etc.

A map of each of the localities together with plans and specifications of the respective works, can be seen on and after Tuesday, the 11th day of September next, at this office for all the works, and for the respective works at the following mentioned places:—

For the works at Galops, at the Lock-keepers House, Galops. For deepening the summit level of the Cornwall Canal, at Dickenson's Landing; and for the new locks, etc., at lock-stations Nos. 18, 19 and 20, at the Town of Cornwall. Printed forms of tenders can be obtained for the respective works at the places mentioned.

In the case of firms there must be attached the actual signatures of the full name, the nature of the occupation and residence of each member of the same and, further, a *bank deposit receipt* for the sum of $6,000 must accompany the tender for the Galops Canal Works, and a *bank deposit receipt* for the sum of $2,000 for each section of the works on the summit level of the Cornwall Canal; and for each of the lock sections on the Cornwall Canal a *bank deposit receipt* for the sum of $4,000.

The respective *deposit receipt*—cheques will not be accepted—must be endorsed over to the Minister of Railways and Canals, and will be forfeited if the party tendering declines entering into contract for the works at the rates and on the terms stated in the offer submitted. The deposit receipts thus sent in will be returned to the respective parties whose tenders are not accepted.

This Department does not, however, bind itself to accept the lowest or any tender.

By order,

A. P. BRADLEY,
Secretary.

Department of Railways and Canals,
Ottawa, 8th August, 1888.

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$34 00@35 00	
1¼ and thicker, three uppers, Am ins.		40 00
1¼ and thicker, pickings, Am ins		30 00
1 x 10 and 12 dressing and better	20 00	22 00
1 x 10 and 12 mill run	15 00	16 00
1 x 10 and 12 dressing	15 00	16 00
1 x 10 and 12 common	12 00	13 00
1 x 10 and 12 spruce culls	10 00	11 00
1 x 10 and 12 maple culls		9 00
1 inch clear and picks	24 00	26 00
1 inch dressing and better	18 00	20 00
1 inch siding, mill run	13 00	15 00
1 inch siding, common	12 00	13 00
1 inch siding, ship culls	10 00	11 00
1 inch siding, mill culls	8 00	9 00
Cull scantling	8 00	9 00
1¼ and thicker cutting up plank	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run	14 00	16 00
1 inch strips, common	11 00	12 00
1¼ inch flooring		15 00
1½ inch flooring		15 00
XXX shingles, sawn	$2 40@2 50	
XX shingles, sawn	1 30	1 50
Eastlake painted iron shingles, per square, (10 feet)		4 50
Eastlake painted tin shingles, per square		4 50
Eastlake genuine galvanized iron shingles, per square		7 00
Imitation brick siding, per square		3 50
Special siding, per square		3 50
Lath, sawn		1 80

YARD QUOTATIONS.

Mill cull boards and scantling		10 00
Shipping cull boards, promiscuous widths		12 00
Shipping cull boards, stocks		13 00
Scantling and joist, up to 16 ft		14 00
" " 18 ft		15 00
" " 20 ft		16 00
" " 22 ft		17 00
" " 24 ft		19 00
" " 26 ft		20 00
" " 28 ft		22 00
" " 30 ft		24 00
" " 32 ft		26 00
" " 34 ft		28 50
" " 36 ft		30 00
" " 38 ft		32 00
" " 40 to 44 ft		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board,	18 00	20 00
Dressing stocks	16 00	18 00
Picks, American inspection		40 00
Three uppers, American inspection		50 00
Cedar for block paving, per cord		5 00
Cedar for Kerbing, 4 x 14, per M		12 00
1½ inch flooring, dressed	25 09	30 00
1½ inch flooring rough	14 00	15 00
1¼ " dressed	23 00	25 00
" undressed		14 00
" dressed	16 00	20 00
" undressed	12 00	14 00
Beaded sheeting, dressed	18 00	20 00
Clapboarding, dressed		12 50
XXX sawn shingles, per M	2 75	2 90
Sawn lath		2 25
Red oak	20 00	25 00
White	25 00	30 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2	50 00	60 00
White ash, No. 1 and 2	25 00	30 00
Black ash, No. 1 and 2	20 00	25 00

BRICK.—℘ M.

Common Walling		$7 50
Good Facing		10 00
Sewer		9 50
Stone:		
Lommon Rubble, Per Toise, delivered		14 00
Farge flat " " "		18 00
Foundation Blocks, " Cubic Foot		35
Slate: Roofing (℘ square).		
" green	5 00	6 00
" " unfading	5 00	6 00
" purple	5 00	6 00
" red		10 00
" black, Lehigh	3 50	4 00
" " Chapmans	—	—
" unfading black, Monson, Me	5 50	8 00
" black slate		7 50
Tiles, American, ℘ M		
N. Peach Bottom, warranted unfading		
Sand:		
Per Load of 1½ Cubic Yards		1 25

PAINTS. (In oil, ℘ lb.)

White lead, Can	6	6 50
" zinc, Can	6½	8 50
Red lead, Eng	5½	6½
" venetian	6½	7½
" vermilion	90	1 00
" Indian, Eng	10	12
Yellow ochre	6½	12
Yellow chrome	15	25
Green, chrome	7	12
" Paris	30	40
Black, lamp	17	25
Blue, ultramarine	15	25
Oil, linseed, raw (℘ Imp. gal.)		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty	2¾	3
Whiting, dry	75	1 00
Paris white, Eng., dry	1 25	1 50
Litharge, Am., "	6½	8
Lienna, burnt	15	20
Umber, "	8	12¾

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey		40
" " " White		60
Plaster, Calcined, New Brunswick		2 20
" " Nova Scotia		2 10
Hair, Plasterers', per bag		1 00
Cement, Portland, per bbl		3 00
" Thorold, "		1 50
" Queenston, "		1 50

HARDWARE.

Cut Nails:		
American Pattern, 1¼ inch, per keg		4 40
" " 1½ to 1¾ inch, per keg		3 65
Canadian Pattern, 1¼ inch, per keg		3 90
" " 1½ to 1¾ inch, per keg		3 40
" " 2 to 2¼ inch, "		3 40
" " 2½ to 2¾ inch, "		3 15
" " 3 inch and larger		2 90
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg		6 05
" " 1¼ inch, "		5 30
" " 1½ " "		5 05
" " 1¾ " "		3 60
" " 2 inch and larger		4 00
Iron, etc.		
Refined, ℘ 100 lb. or ordinary size	2 25	2 35
Common, ℘ 100 lbs	2 00	2 10
Patent metals, ℘ lb	0 00	0 11
Anchors, ℘ lb	0 05½	0 06
Chain cables, ℘ lb	0 03	0 06
Rigging chains, per lb	0 03	0 3½
Galvanized Iron Roofing, per square		5 00

MONTREAL PRICES.

Lumber, Etc.		
Ash, 1 to 4 in., M	$13 00@20 00	
Birch, 1 to 4 inch, M	16 00	25 00
Basswood	13 00	20 00
Walnut, per M	55 00	95 00
Butternut, per M	25 00	40 00
Cedar, flat	00 04	00 06
Cherry, per M	65 00	90 00
Elm, Soft, 1st	15 00	17 00
Elm, Rock	25 00	30 00
Maple, hard, M	20 00	25 00
Maple, Soft	16 00	24 00
Oak, M	40 00	80 00
Pine, select, M	35 00	40 00
Pine, 2nd quality, M	22 00	27 00
Shipping Culls	14 00	16 00
Mill Culls	8 00	10 00
Lath, M	1 70	1 85
Spruce, 1 to 2 inch, M	10 00	13 00
" Culls	4 50	6 00
Shingles, 1st quality	2 00	3 00
" 2nd "	1 25	2 00
Cement, etc.		
Portland Cement, per barrel	$2 45@2 75	
Roman " "	2 70	3 00
Fire Bricks, per M	22 50	25 00
Cut Nails:		
Hot-cut Am. or Can. pattern, 3 inch and above		$2 60
Hot-cut Am. or Can. pattern, 2¾ inch and above		2 58
Hot-Cut Am. or Can. pattern, 2¼ and 2 inch		3 10
Am. pattern, 1½ and 1¾ inch hot-cut		3 35
" 1¼ inch " "		4 10
Can. Pattern, cold-cut, 1½ and 1¾ inch		3 20
" " 1¼ inch		3 90
Finishing Nails, per 100 lb. keg, 1¼		
Finishing Nails, per 100 lb. keg 1½ to 1¾ inch	4 25	4 40
and 1¼ inch	$5 25	4 40
Finishing Nails, per 100 lb. keg, 2 inch and up		3 70
Paints, etc.		
White Lead, pure, 25 to 100 lb. kegs	6 00	6 25
" No. 1	5 25	5 50
" No. 2	4 75	5 00
" No. 3	4 50	4 75
" dry	5 25	5 75
Venetian Red, English	1 50	1 75
Yellow Ochre, French	1 25	3 00
Whiting, London, washed	0 50	0 60
" Paris, "	1 15	1 25
Oils:		
Linseed, raw	0 53	0 57
" boiled	0 57	0 60
Oive, pure	1 00	1 10
" machinery	0 95	1 00
" extra, qt., per case	3 00	3 25
" pts., "	2 40	2 60
" ½ pts., "	2 70	3 00
Spirits turpentine	0 55	0 60

ST. JOHN, N. B.

Lumber.		
Spruce deals, Bay Fundy Mills	8 00	8 25
Spruce deals, City Mills	8 50	9 50
Aristook P. B., Nos. 1 and 2	40 00	45 00
No. 3	30 00	35 00
No. 4	15 00	20 00
Aristook P. B. shipping	15 00	16 00
Common	12 00	13 00
Spruce boards	7 00	8 00
Spruce scantling (unst'd)	7 00	8 00
Spruce, dimensions	11 00	14 00
Pine clapboards, extra	5 00	40 00
No. 1	0 00	30 00
No. 2	30 00	20 00
No. 3	11 00	12 00
Laths, spruce	1 25	1 35
Laths, pine	5 50	8 00
Palings, spruce	5 50	8 00

WANTED.

YOUNG MAN acquainted with architectural drawing, to study architectural iron work. Apply to

BARNUM WIRE & IRON WORKS,
Walkerville, Ont.

Notice to Iron Bridge Builders.

SEALED TENDERS addressed to the undersigned, and endorsed "Tenders for Chaudiere Bridge," will be received at this office until Friday, the 5th day of October next, for replacing the present roadway of the Suspension Bridge across the Ottawa, at the city of Ottawa, with an Iron Truss Bridge, in accordance with a specification incorporated in and forming part of a form of tender, a copy of which, together with a plan of the present structure, will be supplied to Iron Bridge Builders only, on application to the Chief Engineer.

Tenders must be accompanied by plans, specifications and strain sheets of the structure proposed to be constructed, and also a description in detail of the mode or manner in which it is to be erected and put in place, as no interference with the present bridge or the traffic across the same will be permitted, except as stated in the specification; and they—the tenders—will not be considered unless made on the forms supplied, and signed with the actual signatures of the tenderers.

An accepted bank cheque, payable to the order of the Minister of Public Works, equal to *five per cent. of amount of tender* must accompany each tender. This cheque will be forfeited if the party decline the contract, or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

By order, A. GOBEIL,
Department of Public Works, Secretary.
Ottawa, 10th September, 1888.

TIMBER SALE.

THERE will be offered for sale at Public Auction, at the Court House, in the Town of Port Arthur, on Wednesday, the nineteenth day of September, at the hour of 2 o'clock p.m., the Pine Timber of not less than eight inches in diameter at the butt, on the Eagle Lake Reserve in the Province of Ontario.

CONDITIONS OF SALE:—Bonus cash at time of sale, and dues to be paid before removal of timber on all timber cut on the limit in accordance with tariff or dues of this Department, also an annual ground rent to be paid of $4.00 per square mile, and a license fee of $4.00. The purchaser to remove the timber within three years from date of sale. Also the purchaser to deliver free of charge to the Indians on the said Reserve, thirty thousand feet of lumber suitable for building houses.

For further particulars please apply to John McIntyre, Esq., Indian Agent, Fort William, or to the Department of Indian Affairs, Ottawa.

No other paper to insert this advertisement without authority through the Queen's Printer.

L. VANKOUGHNET,
Deputy of the Supt. Genl. of Indian Affairs.

Dept. of Indian Affairs,
Ottawa, 22nd Aug., 1888.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Post Office, Goderich, Ont.," will be received at this office until Monday, 15th October, 1888 for the several works required in the erection of Post Office, &c., at Goderich, Ont.

Specifications and drawings can be seen at the Department of Public Works, Ottawa, and at the office of the Town Clerk at Goderich, Ont., on and after Wednesday, 5th September, and tenders will not be considered unless made on the form supplied and signed with actual signatures of tenderers.

An accepted bank cheque, payable to the order of the Minister of Public Works, equal to *five per cent of amount of tender* must accompany each tender. This cheque will be forfeited if the party decline the contract, or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

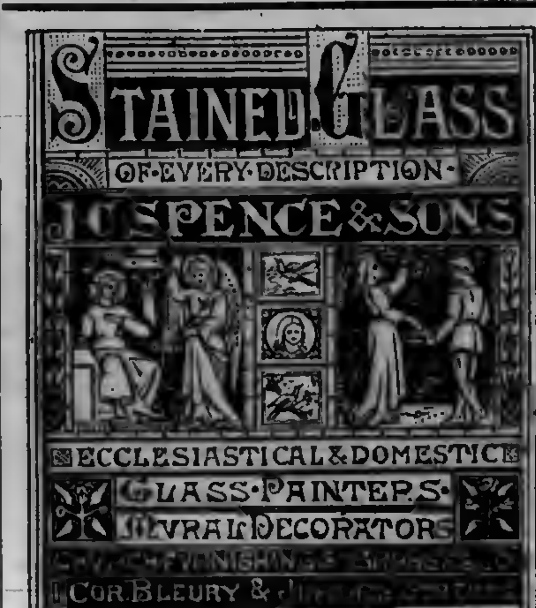
By order, A. GOBEIL,
Department of Public Works, Secretary.
Ottawa, 31st August, 1888.

SEALED TENDERS addressed to the undersigned, and endorsed "Tenders for Elevators, &c., New Departmental Building, Ottawa," will be received until Monday, 17th September, next.

All necessary information can be obtained at this Department on and after Monday, 20th inst.

Each tender must be accompanied by an *accepted* bank cheque made payable to the order of the Honorable the Minister of Public Works, *equal to five per cent.* of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department will not be bound to accept the lowest or any tender. By order,
Dept. of Public Works } A. GOBEIL, Secretary.
Otawa, Aug. 14th, 1888.



SEE In operation at Toronto Fair, 10th to 21st September, our Portable Saw Mill, Shingle and Lath Mills, Planer and Matcher, Chopping Mills, Governors, Saws, Ewart Link Belting, and Our Popular CHAMPION FARM TRACTION ENGINE.

Toronto and Ottawa

Also at Ottawa Fair, 24th to 28th Sept., operation, in Heavy Stationary Engine, Double Edger, Iron Plane, Planer, Matcher and Moulder, Shingle, Lath Machine and Chopping Mill, and Ewart Link Belting.

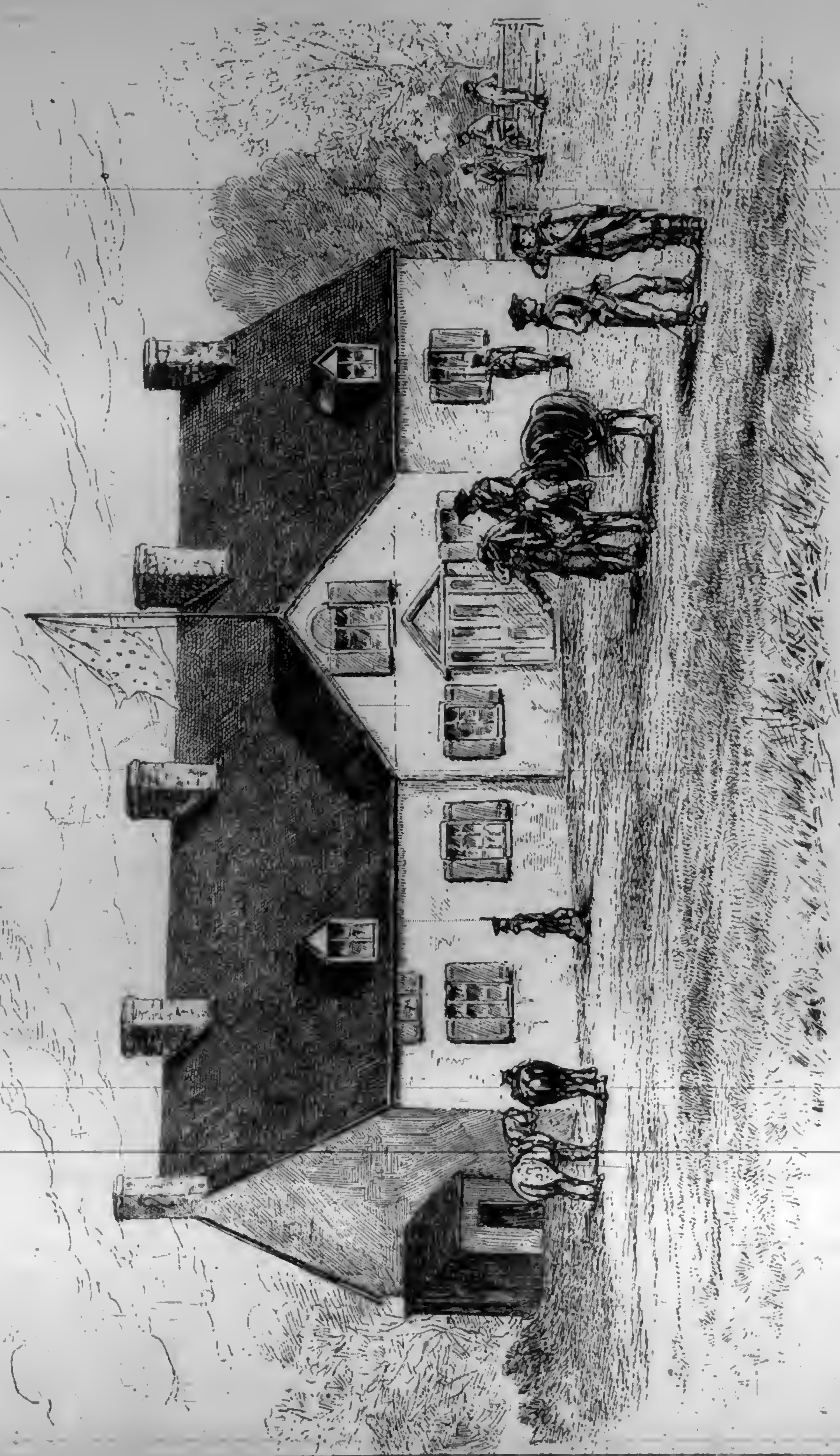
WATEROUS ENGINE WORKS CO., BRANTFORD, Canada.

FOUND AT LAST!

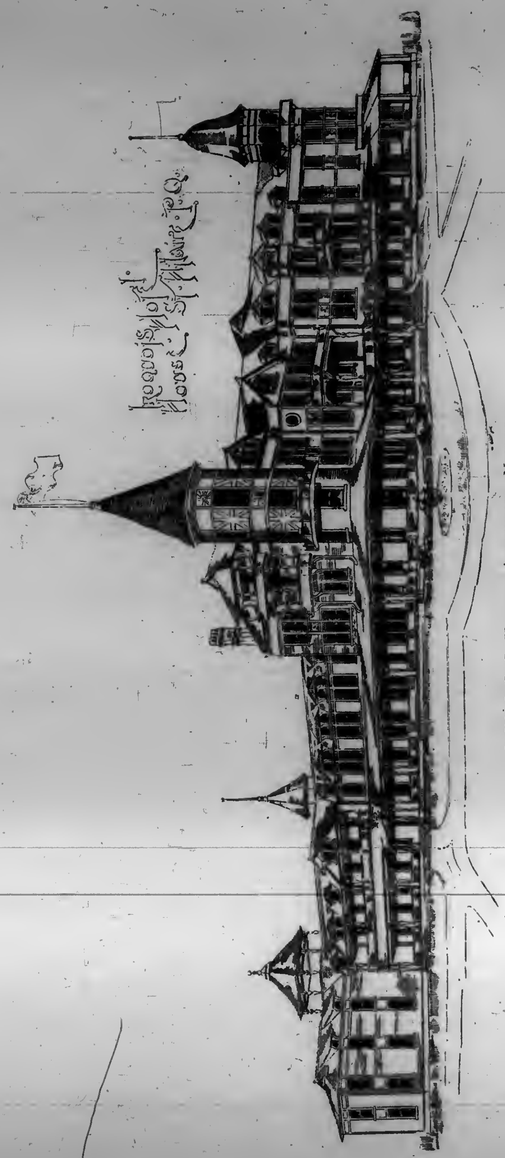
PERFECT FITTING STOVE PIPE.

It can be taken down after using and 25 lengths packed away in a small space of 18 x 9 inches. Every joint crimped and ready for use. No rivets required. Can be bought at same price as ordinary misfitting stove pipes. For sale by dealers every where.

THOS. McDONALD & CO., - QUEEN CITY GALVANIZING WORKS,
MANUFACTURERS
69 TO 75 SHERBOURNE STREET, - TORONTO.



MONTCALM'S HEADQUARTERS AT BEAUPORT—1759.



Hospital of the Sacred Heart, Notre Dame, P.Q.

J. W. & F. C. Hopkins, Architects, Montreal.

PUBLISHED MONTHLY IN THE INTERESTS OF
Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No X. TORONTO, CANADA, OCTOBER, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—
Canadian Architect and Builder
A JOURNAL OF MODERN CONSTRUCTION METHODS,
PUBLISHED MONTHLY IN THE INTEREST OF
ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.
C. H. MORTIMER, Publisher,
31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

In ordering change of address give the old as well as the new address. Failure to receive the paper promptly should be reported to this office.

ADVERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

REFERRING to the remarkable attitude assumed by the Toronto Trades and Labor Council in opposition to the proposal to introduce manual training into public schools, the Philadelphia *Record* says:—"Canadian workmen must be far below their American brethren in intelligence to form such a narrow-minded and erroneous idea of a system which seeks to extend the producing power of a country, to widen the opportunities for skill and handicraft."

OUR Hamilton correspondent has repeatedly called attention in these columns to the very unbusiness-like and unsatisfactory manner in which the building record of that city is kept. So far as its usefulness is concerned, the city would probably be as well off without a record of any kind. We notice that in New Orleans, where a somewhat similar state of things has existed, the builders themselves will hereafter insist upon having the records properly kept. We hope the architects and builders of Hamilton will also adopt this course, in order that an intelligent estimate may be formed of the amount, character and cost of the buildings erected.

BRANTFORD, Berlin, and other cities and towns in Ontario, have lately adopted improved systems of water supply, and as a consequence, are now brought face to face with the problem of the best method by which to dispose of their sewage. The citizens of these places are aware that the proper course to pursue is not to dump the sewage into the nearest creek or river. In this respect Toronto has probably served as a "horrible example," which her neighbors are wisely determined to profit by. We regret that the city of first importance in Ontario has not yet solved the sewage problem for itself, and is accordingly not in a position to help those who are grappling with the question for the first time. One paper suggests that municipal corporations should not be required to bear the expense of experimenting and finding out which is the best method of sewage disposal, but that the Provincial Government should undertake to deal with the subject in the interests of the whole province. We are in accord with this opinion. The Provincial Government is in a better position than the corporation of any town or city can be to make the necessary experiments, and collect all possible data bearing on the subject. Furthermore, the required information might in this way be obtained at a fraction of the amount which it would cost the municipalities to conduct their investigations individually. We trust the time is not far distant when a Department of Hygiene, with all the appliances necessary to solve questions of this kind, will be established by the Government of this Province. The cost of establishing and maintaining such a Department would be a mere bagatelle as compared with the amount spent by this and other cities for expert opinion. At present we have no recognized governmental authority whose opinions should serve to decide the thousand and one matters affecting the health and lives of our people.

THE tearing up of an old corduroy roadway on St. Patrick street, in this city, to be replaced by cedar block pavement, served to remind citizens the other day of Toronto's youth, and of the wonderful progress made in the last quarter of a century. Speaking of pavements, calls to recollection the fact that within a very brief period the city will be called upon to substitute something more durable for the cedar block roadways on the three principal thoroughfares of the city—King, Queen and Yonge streets. A costly mistake was committed when streets carrying such a large amount of traffic and traversed by the street railway, were cedar block paved. Let us hope that when the work comes to be done over again, the best kind of materials, and the proper method of putting them down, will receive full consideration.

IT is surprising how little space is given by the daily press to the important subject of the preservation of the public health. It is probably because there is so much apathy on the part of the public itself. Because a considerable number of people are intensely interested in baseball and prize-fighting, our leading daily papers devote a page every day to imparting news of that character. It seems to be a question of supply and demand. Just at present, the people of Toronto and other Canadian cities and towns are aroused from their wonted indifference to health measures by the fear of a small-pox epidemic. As a result of this awakening, the daily press has suddenly taken to discussing sanitary methods. What we would like to see, would be the manifestation of greater interest in health preservation in times of supposed safety as well as at a time like the present.

WE present our readers this month with a perspective sketch of the proposed new Court House and City Hall for the city of Toronto. The estimated cost of erecting the building in accordance with this design, is about $1,400,000. After the citizens have been given full information concerning the character of the buildings which it is proposed to erect, and have had an opportunity to examine the plans, and judge for themselves as to their adaptability for the purpose intended, they will be asked to vote $600,000 in addition to the amount already voted for the construction of the buildings. We trust the money will be forthcoming. The opinion expressed by a Toronto paper, that the present City Hall and Court House will be good enough for fifteen years to come, is not deserving of a moment's consideration. The same journal which opposes the erection of the proposed new public buildings, on the ground of economy, urges the "wealthy city of Toronto" to invest large sums of money in new land and buildings for Exhibition purposes. The inconsistency of such arguments robs them of any value. Our present Court House and City Hall have been a standing disgrace to Toronto during the last five years, and will have to be replaced by something more in keeping with the city's importance and progress. This being the case, no good purpose can be served by delaying the commencement of the enterprise for a year or two longer. While the cost of the proposed buildings is considerably greater than was at first anticipated, we know of no cities in the United States of equal size and importance, where from one to three million dollars has not been spent for similar purposes. A future generation will be called upon to pay a large proportion of the cost of the structure, and it is safe to assume that they will prefer to pay for a building that will in their day be standing intact and an ornament to the city, rather than for one already crumbling to decay, and suggestive only of the short-sightedness of their forefathers.

We had the pleasure of examining the plans of the proposed new Court House and Municipal Buildings a few days ago and was very much pleased with them indeed. There has been an immense amount of labor expended on these drawings, none can know how much except those who have gone through a similar experience. The plan is so simple in its arrangement that no no person need be puzzled to find any room in the building. This is a very great advantage, and must have required much thought to evolve a plan so perfect and yet so simple. The entire plan of the building is good throughout, especially the arrangement of the court rooms and their attendant rooms. The elevations call for high praise, and we have no doubt but that the citizens will be proud of the building when it is erected, and also of the fact that the designer is a Canadian. We could not help comparing the design of this building with the one according to which the Parliament Buildings are being erected. It certainly does not suffer by the comparison, but rather it shows how very poor a design the imported one really is. The two buildings are about equal in size, and yet one seems to be a mass of disorganized parts, and the other a compact whole. Certainly the foreign design for the Parliament Buildings will not compare with the home production for the Court House. If the Canadian design for the Parliament Buildings were being carried out, and the Court House being built according to the present design, Toronto would have had two very large buildings of which it need not have been ashamed.

SINCE our last issue the plumbers' strike in Toronto came to an end. It lasted nearly three months, to the great loss of the strikers and likewise the employers. We are of the opinion that the strike could have been avoided if the question in dispute had been approached in a moderate and reasonable spirit. They were eventually settled after many weeks of idleness on the part of the men, loss of business on the part of the masters, and with loss and trouble to many persons who were only indirectly concerned. The loss which falls on outside parties, calls for some means of settling these strikes outside of the parties directly interested. If they were the only sufferers, we could stand and look on with greater indifference. But such is not the case, and as many who suffer have no voice in the matter, some means should be worked out whereby quiet settlements between workmen and their employers could be brought about. There

should be a board of arbitrators, or some court of the kind, where all questions in dispute could be argued, and a reasonable and just settlement obtained.

WE notice in *Building* an illustration of a house proposed to be erected in this city by one of its residents. The design was prepared by a New York architect, and is certainly a very good one. We would like to welcome the erection in this city of many houses of equal artistic merit. But notwithstanding that it is a good design, we certainly could name several Canadian architects who could and would prepare designs of equal, if not greater excellence. That Canadian architects do not design houses equal to many of the expensive houses in the States, is because their clients have not the wherewithal to pay for their construction. Architects in the States are not better able than our own to make bricks without straw. In Canada they are even asked to make them with a short allowance of clay, and if the article is not equal to that made with the full complement of materials, the unfortunate architect is made the subject of blame. Good work must be paid for, whether it be material or the product of the intellect, and those who cannot pay must be content with what they are able to afford. It is time that persons building should understand that architects must as nearly as possible fulfil the conditions under which their clients place them, and that where they are able to afford what they profess to admire and want, they will have no difficulty in getting their wants supplied without going beyond the bounds of the country where they found it possible to make money, and where, if they were patriotic and capable of recognizing native artistic ability, they would take pleasure in spending it.

WE should like to see the building interest, which stands second to but few others in this country, occupy a more prominent place in connection with the annual Industrial Exhibition held in this city. While there were quite a number of exhibitors of building materials at the recent Exhibition, many lines of goods were not represented at all. We have been led to think that perhaps this was due to the very unsatisfactory accommodation provided for exhibitors. No attempt seems to have been made to classify goods, but exhibits were crowded in wherever there was a bit of space to spare, regardless of their surroundings. At the Exhibition this year, could be seen side by side, pressed brick and pianos, organs and jewelry, brick machines and agricultural implements; improved water closets and specimens of cookery. Perhaps with the present number of buildings it may be impossible to make a better classification of exhibits. If that be the case, then we hope to see some new buildings erected during the coming year. We would suggest to the Exhibition Association that a building should be set apart exclusively for the accommodation of exhibitors of materials entering into the construction and decoration of buildings, in the same manner that Machinery Hall is reserved for machinery manufacturers. If such a step were taken, we have no doubt that the building would not only be fully occupied, but would present one of the most valuable, interesting and attractive features of the Exhibition. In such a building the wonderful improvement which is taking place in materials of construction, as well as in sanitary and decorative appliances, could be shown in properly classified departments, and visitors interested in such goods would know where to find them, and be able to examine them without going through almost every building on the grounds. They would also be given the opportunity of comparing side by side different appliances designed to accomplish the same object, and of judging of their respective merits. We should be pleased to have the opinions of manufacturers and dealers in building materials and appliances on this subject.

A contemporary remarks that among the rules suggested or adopted in various localities for the regulation of electric light circuits, the proposition of Mr. S. S. Wheeler that "an arc lamp within the reach of any man's umbrella is hung too low," is such an obvious common sense suggestion as to commend itself everywhere.

A rich inhabitant of Berlin is erecting a building where patients suffering from tuberculosis may be subjected to a special treatment. The ground floor of the building which is of circular form will consist of stables containing hundreds of cattle. The patients will occupy the upper stories, which will be connected with the ground floor, so that they may inhale constantly the odor of the stables, which will be conveyed to them by especial air tubes.—*Le Progress Medical.*

"CANADIAN ARCHITECT AND BUILDER" PRIZE COMPETITION.

THE publisher of the CANADIAN ARCHITECT AND BUILDER has decided to make a number of improvements in the journal, beginning with the second volume, in January. One of these will be a new heading, artistic in design and expressing the character of the publication. Architects and designers are invited to send us designs for this purpose, drawn with pen and black ink on white bristol board. Size of drawing to be 7¾ inches wide by 2½ inches in depth. Lettering to be the following:

"CANADIAN ARCHITECT AND BUILDER"
FINE AND INDUSTRIAL ARTS, DECORATION, FURNISHING, CONSTRUCTION, SANITATION, ENGINEERING.

If any design sent in should be considered suitable for use, the sum of $15.00 will be paid to the author. All designs must reach us not later than the first day of December next. Each design must be marked with the *nom de plume* of the author, and the author's name, *nom de plume* and full address, must accompany each drawing. In order to obtain a purely Canadian design, this competition is restricted to Canadian designers, who will, we trust, manifest their interest in Canadian enterprise by sending us samples of their best efforts.

INTERESTING AND PROFITABLE.

TORONTO, Oct. 2nd, 1888.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—From the fact that the last two numbers of the CANADIAN ARCHITECT AND BUILDER contained no mention of the recent competition for a $2,000 house, it seems to me that you must have forgotten your promise in the May number to publish criticisms on all the eight designs submitted, but up to the present only three have been made. It would be interesting as well as very profitable to students to see the rest of them criticised.

Yours truly,

STUDENT.

OUR ILLUSTRATIONS.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A $2,500 TOWN HOUSE.—DESIGN BY TAMAR.

THIS author has evidently planned a house for a northeast corner, and with the intention of placing the house in the extreme east side of the lot. We do not understand why anyone when asked to prepare a design for a northwest corner should design one which can only with advantage be placed on a northeast one. If we were to place this house on the lot we specified, we would either have to place the windowless side of the house to the street and east, or else the south front to the east, which would bring the plan about right, except that the bathroom would have a north exposure. We notice that the author, in designating the points of the compass, has made the west the east and the east the west, which is somewhat confusing when one wishes to determine how he intended to place his house. We will again state that the indiscriminate arrangement of rooms without thought of the purposes for which they are intended, and their climatic exposure, is not planning, but an ignorant way of providing a certain amount of required space for strictly utilitarian purposes, without one thought for health or comfort. In this plan we have not one good point, so far as we are able to judge. The dining room is small and inadequate, while the drawing room is unnecessarily large. The entrance to the dining room is bad, and we should rather do without a closet than have one placed like this one. The pantry to the kitchen is useless—in fact the closet and pantry arrangements are bad. The kitchen is too much cut up by doors and windows to be convenient, or even large enough. The outside door to kitchen is very narrow, and the window is correspondingly very wide, and the door should have a porch or some kind of protection from the north winds. The front entrance door opens directly into the hall with the stairs starting much too close to the door. Many of the doors opening into the room are hung on the wrong side—for instance, the bath room door is hung to expose all the fixtures when slightly open. The stairs are much too steep; the cellar stairs being easier than the principal stairs. The spandrie of the main stairs is divided into but two panels, which would never do, and shows lack of experience. The elevations are very poor in design, and badly drawn.

PROPOSED NEW COURT HOUSE AND CITY HALL FOR THE CITY OF TORONTO—E. J. LENNOX, ARCHITECT.

TORONTO ARCHITECTURAL GUILD.

THE monthly dinner of the Toronto Architectural Guild took place at the "Hub" restaurant on Thursday evening, the 11th of Oct. There was a very large attendance of members. Many questions of interest were brought up and discussed in an animated and encouraging manner. Several committees were appointed to report on important matters. A resolution was also passed expressing the interest of the Guild in the success of the CANADIAN ARCHITECT AND BUILDER, and the intention of the members to give it such support and assistance as may be in their power.

MONOTONY IN HOUSE BUILDING.

MR. JOHN J. DEERY, writing in *Home*, deplores the monotony which characterizes the houses in some American cities. As an illustration, he says:—"In Philadelphia, during the past fifteen years, many thousands of houses have been built from a common stereotyped plan, and model, which according to the location and size of lots, have produced houses which, large or small, are all alike on general principles." This lack of architectural variety has left its offensive work upon the City of Toronto, and must prove to be a standing cause of regret to this and future generations of educated Canadians. Within the last five years, we are glad to say, a change for the better has been noticeable, and in those sections of the city which are now being built up, there is much in the outward as well as the interior appearance of the houses to please the eye and accord with correct ideas of the "eternal fitness of things."

ARCHITECTURE IN THE REIGN OF QUEEN VICTORIA.

IN two subjects not precisely architectural, in the common meaning of the word, but of the highest practical importance, there has been an extraordinary progress during the last fifty years. One of these is the science of sanitation, which may be said to belong to this reign. Fifty years ago the current ideas upon the subject of drainage and ventilation were comparatively of the crudest kind and it was hardly recognized that the subject was one specially demanding an architect's attention, except so far as some general perfunctory attention to fall and brick traps was concerned. A good many of the artistic architects are much in default in this respect now, but the knowledge that they are so, and that sanitation is a subject which some one, at all events, must attend to, is forced upon them; and in general there is now a degree of study given to the sanitary requirements of buildings which was not dreamed of fifty years ago; a study which, it may be added, has resulted in condemnation or absolute reversal of some of the sanitary beliefs and expedients of that period. The other subject we refer to is the progress in regard to the improvement in the habitations of the poorer classes, and the recognition, to some extent at least, of the responsibility resting with landlords and with the Government in regard to this subject, the part taken many years ago by this journal in urging attention to this subject is known to all who are acquainted with the history of the amelioration of artisans' dwellings; and though much remains to be done in this respect, what has been already accomplished may count among the architectural achievements of the present reign; and while we have witnessed the foundation of a new cathedral (unfortunately only a good mediæval copy and with no Victoria *cachet* about it), we may, perhaps, be justified in thinking that the many blocks of healthy dwellings which have been built during late years, not indeed beautiful architecturally, but representing the possibility of decent, comfortable, and healthy housing for the poor, are as important architectural works in their way as cathedrals and churches. In regard to sanitary progress, by the way, it is worth remarking that one of the most recent pieces of work for which public money was voted was the rectification and putting on a proper and efficient footing the drainage of that same great House of Legislation, the commencement of the present reign; architecture was done fifty years ago, and adequate drainage supplied now—a significant indication of the progress in practical matters, which has been made during the period we are considering.

Though there has been a good deal said of late as to the desirability of drawing architecture and engineering closer together, as a matter of fact the two professions are farther dissociated in the manner and aspect of their

works than ever; and the greatest piece of constructional work at present going on, the greatest in some ways that has been attempted, is the gigantic structure at the Firth of Forth, from which everything that we generally call architectural design has been entirely eliminated, nothing being left, so to speak, but the bare poles of construction. Such a work as this is an appropriate culmination to a half-century in which the most numerous and remarkable constructional works have certainly been those of the engineers. Engineering has known what it wanted, it and the public have known what they wanted from it; that is the secret. In architecture there has been doubt and experimenting on one side, and a good deal of public indifference on the other side. As to the latter drawback, we see little immediate prospect of improvement; architecture is still a kind of sealed book, and a subject of indifference to the public, but the art itself appears to be in a healthier and more promising condition that it was at the beginning of the present reign, it has more of life and originality, is less fettered by precedent, and has a sounder basis of sanitary and constructional knowledge; and these are conditions which may make us hopeful for the future achievements of English architecture during the remainder of a reign which we all trust may still be prolonged for many years.—Abstract from an article in the *Builder*.

Plans are invited from the architects of all nations for a municipal theatre in Cracow, Austria. Prizes of 2,500, 1,500 and 1,000 florins will be awarded for the best plans by a jury of experts, whose names are soon to be announced. The sum of 1,500 florins has also been reserved for the purchase of such other plans as may be recommended by the jury. Plans must be submitted not later than March 1, 1889, to Dr. Szlachtowski, President of the city of Cracow, from whom all the necessary data can be obtained.

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

PRACTICAL HINTS TO CARPENTERS.

BY OWEN B. MAGINNIS.

When setting door jambs on underflooring, or where the finishing floor is not yet laid, always take the following precautions:—First. Place a straight edge across the floor to each stud at each opening to ascertain if the weight of partition has not sunk it out of level. Second—Ask the foreman if there are base blocks on the trim. Now, if there are, base blocks and the base must be kept level. Supposing one opening has the floor sunk a ½ inch below the level, and another 1 inch below, the difficulty will be to set the jambs so that each base block will be level with the other, and the door heads their proper height and level. In such a case proceed as follows:

The height of the doors being determined by one 8-6 clear of head and floor and one 9-6, nail the heads and jambs together and tack a piece across the edges of the jambs about 12 inches from the bottom, equally distant from the head, about 7-6 down, and keep the jambs parallel by marking the piece with the pencil equal to the inside distance at the head. This being done, obtain a 10 foot rod and lay off 8-7½ for the 8-6 jambs, and mark this length on one edge of each jamb. This mark will be the *scribe line* for the jambs, or their exact length. Set them in the opening between the studs, and place a true level on the ship and wedge up the lowest side until the bulb is exactly in the centre. Now set your compasses to the line on the stile resting on the floor, and keeping the jambs about plumb, scribe them to the floor, saw these lines, *always leaving the line on*, and replace the jambs far out from the studs, and nail them perfectly plumb and straight on the face. Be sure they are perfectly straight and wedge out all short crooks and lumps. There is too much careless jamb setting just now, and one has only to fit a few doors to find this out. Also keep them square to the edges and be sure they are not nailed in wind.

The object of nailing on the strip is, that by tacking it on equally distant from the head and leveling it, the head is likewise leveled without the trouble of climbing upon a horse. The ½ inch being added to the length brings the head up ½ inch higher, so that the base will come level with the top of the base block on the trim.

The 9-6 jambs are set in the same way, except that a 1 inch is allowed 9-8 instead of ½ inch. The extra inch on the length as 8-7, 9-7 is to allow for the finishing floor 1 inch thick. This method should always be followed for first class trim when there is a supervising architect who uses his eyes. In trimming doors, the trim now comes to the building put together, or with the stiles and head casing glued and dowled perfectly square, fitted and varnished or polished, all ready to nail up, so it is absolutely necessary that the jambs be properly set and their edges leveled to ensure the joints being close.

Jambs should never be set too wide for the thickness of the wall, as in a great many cases no wall molding is employed, and the back joint must fit to the plaster. They must also be out of wind.

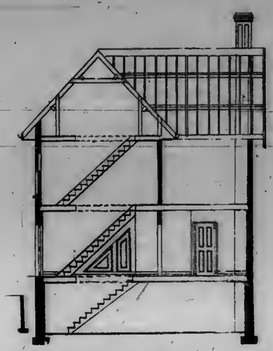
In nailing on trim, care should be taken to have the margin on the edge, showing equally all round, for it often occurs that the trim may be put together and 1-16 of an inch more or less than the dimensions shown on the details; therefore, if only an 1-8 is shown on the stiles, the same must be left on the head. One thing in particular must be well done, namely, to fur well under the back edges of all casings and corner blocks, and to fit the wall mold close, as the recesses left by carelessness in this respect are too often the abodes of bugs, roaches, etc.

"What are you doing?" demanded a citizen of a countryman who was critically examining the former's electric bell-knob. "Say, mister," replied the countryman, straightening up, "there's suthin' the matter with your door-bell. The knob's got pulled clear into the hole."

A Swiss inventor has perfected a method of making artificial boards, and is advocating their use in building. They are made of a mixture of plaster of paris and reeds, pressed into shape by hydraulic process. The material has the advantage of incombustibility and lightness, and will resist the warping action of atmospheric changes.

— South Elevation. —

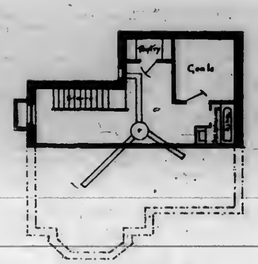
— East Elevation. —



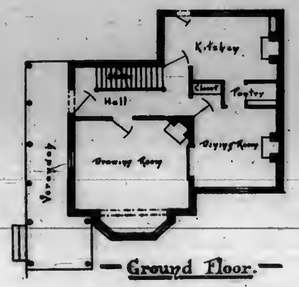
— Section —

— DESIGN FOR A —

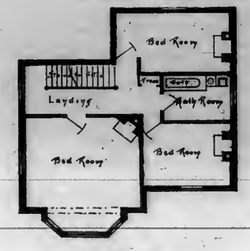
— $2500 HOUSE. —



— Basement. —



— Ground Floor. —



— First Floor. —

DESIGN FOR A $2,500 TOWN HOUSE—BY "TAMAR."

ST. JOHN, N. B.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

YOU are probably aware that this city has risen, Phœnix like, from the ashes of the 1877 fire, and shares with Chicago the earned emblematical soubriquet of "Phœnix City," instead of "the Liverpool of America" that so aptly personified the facilities and business of the should-be eastern terminus of the Canadian Pacific railroad.

The recent fire of a month ago has partly laid bare a site for the long contemplated "Grand Opera House," for which preliminary plans have been prepared and a subscription list for stock opened, All indications point to a practical realization of the most sanguine hopes of the company. Theatres have had a somewhat transient and hard line existence here, the old Lyceum to the contrary notwithstanding. The play house of St. John's father of dramatics, Lonergan's Lyceum of the south side King's Square, the Academy of Music, of German street, and Small's Hall, (more familiarly known as Bishop's & Lee's Opera House and Professor Neilson's "Figaro") were all destroyed in the holocaust of the 20th of June, 1877, leaving only the Mechanics' Institute, now in its fiftieth year, and Dockerill Hall, of Union street, as available for entertainments. As flame has been historical the world over for the destruction of the play house, it is well that the company in this case intend to look well to having their building fire proof, with three separate exits, and two iron fire escapes.

The only buildings of a public character now in course of erection in St. John are the electric light works building, and Secord's Hospital, both in brick with principally stone trimmings.

QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE large stores being erected for Mr. O. E. Murphy on Dalhousie street, are nearing completion. The front on the street named is 140 feet, with two extensions in rear 60 feet, the whole being 40 feet in width and three stories in height. The design is perfectly plain, walls faced with pressed red brick. Mr. O'Leary contracted for the mason work, and Mr. S. Peters for the woodwork; Mr. Hume, C.E., prepared the plans.

A handsome stone residence from the design of Mr. E. Charest, architect, is being erected by Messrs. Larrose, mason, and Mr. DeVarennes, carpenter, for Mr. Dussault, of the firm of B. Houde & Co., tobacco manufacturers. The walls are of rock faced Deschambault stone in regular courses, with trimmings of same stone, chiselled. Stone steps leading to a portico, and terminating in a tower placed in the centre of the front, give a bold and handsome appearance to the building. It stands immediately opposite St. John's church on the street bearing the same name, with stables, etc., in rear of house. The cost will be in the neighborhood of $20,000.

A cottage residence is being put up for Mr. J. J. Boyce on D'Aiquillon street, at a cost of about $4,000. Rock faced stone foundation, walls of white brick, and trimmings of cut stone, Mr. H. Staveley, architect; J. Kelly, carpenter, and J. Juneau, mason.

ENGINEERING SOCIETY.

WE are pleased to notice that the Engineering Society in connection with the School of Practical Science in this city enters upon its work for the coming winter under most favorable auspices. The membership of the Society numbers upwards of 140. The objects of the organization are stated to be:

1. The encouraging of original research in the science of engineering.
2. The preservation of the results of such research.
3. The dissemination of these results among its members.
4. The cultivation of a spirit of mutual assistance among the members in the practice of the profession of engineering.

At the semi weekly meetings of the Society, papers on engineering and scientific subjects are read and discussed by students and professors. The president for the present year is Mr. H. E. T. Haultain.

JOINTS IM SEWER PIPE.

THE joints in stone-ware sewer pipe are a generally acknowledged point of weakness, says a writer in the *Building Budget*, and in sewers within the house walls architects have to a certain extent tried to overcome this by embedding the sewer in concrete. Under the test of filling the sewer with water this is not found to make an impervious drain, and we would suggest as a surer method of making a tight drain, the following clause for the specifications: "Each joint shall be made by filling the joint perfectly with portland cement mortar made of one part cement and one part sand, caulking the same thoroughly all around the pipe with a proper hardwood caulking tool, making the joint flush with the end of the socket, and striking it off smooth all around the pipe with a trowel." Throwing on more mortar and striking off to make an outside collar may be as each architect considers necessary, but the joints made as above will be tighter and stronger than if the sewer were imbedded in concrete as ordinarily made. It is not safe, however, to specify this and leave it to be done or omitted as the drain-layer sees fit. House drains should be laid in open trenches, and during pipe-laying the superintendent should see every pipe laid.

HOW VANCOUVER WAS BUILT.

A GENTLEMAN who arrived in Boston yesterday fresh from Vancouver, the Pacific terminus of the transcontinental railway, gives the genesis of that city in terms which are as startling as they are significant. Two years ago there was but one house in the locality. A year ago there were a dozen straggling log huts. To-day there is a population of 5,000 persons; the Victoria Hotel is one of the finest houses in the country, charging $4 a day and worth it; the main street, built through the virgin forest, as it stood a year ago, is flanked by granite blocks that rest where stumps fifteen feet or more in diameter have been blown out by dynamite; the town is lighted by electricity; there is semi-weekly communicaton with China and Japan by steamship, and the Canadian Pacific keeps that northernmost city on the Pacific coast in daily communication with the eastern world. All this is substantially a year's work. Other places of this size, or even greater, have sprung up in a night like Jonah's gourd, but it is believed that there is no record on the American continent of the building of a similar town; with all the improvements of modern civilization, within so short a space of time.—*Boston Herald.*

Mortar and paint may be removed from window glass with hot, sharp vinegar.

Wide lath do not make a good job of plastering on a ceiling. Use inch lath and give them good distance apart.

Mr. Sewery has commenced the erection of his new stove works at Barrie, Ont.

Tenders are being asked for the construction of an iron truss bridge over the Ottawa river to connect Ottawa city with the city of Hull.

Good stable floors may be made by first paving with broken stones and then covering with concrete, and finally laying the whole with plank.

It is reported that Messrs. Davis, of Ottawa, and E. E. Gilbert, of Montreal, have been given the contract for improvements on the Cornwall canal.

To prevent screws from becoming fixed and rusted, make a mixture of graphite and oil, which will facilitate the tightening of them up, reducing the friction in the sockets, and protecting them for years from rust.

Asbestos powder, made into a thick paste, with liquid silicate of soda, is used with great advantage in making joints, fitting tops, connecting pipes, filling cracks, etc. It hardens very quickly, stands any heat, and is steam-tight.

The *Builder and Woodworker* points out that thoughtless acts on the part of workmen sometimes lead to disastrous results. A well-known instance of a falling mill has been ascribed to fastening a block and tackle to a column and pulling it out of position while moving some heavy machinery. A few years ago, one of the roof-trusses fell into the hall in Marblehead, Mass., because a piper had cut one of the members nearly in twain, rather then make an offset in his pipe.

We learn from the *Engineering and Building Record* that the engineers of the Minneapolis Sewer Department are meeting with trouble from water in the sewer tunnel that they are now building, and of which about 1,000 feet remain unfinished. Engineer Van Duzee has suggested two plans for overcoming the difficulty, one by freezing and the other by the use of compressed air, at an esitimated cost of $40,000 and $15,000 respectively. Mr. Van Duzee favors the internal shield plan, but its use has been opposed on account of the expense.

A new brick machine of simple construction is reported upon favorably from Nashville, Tenn. It is the invention of Mr. John E. Lesueur, an extensive manufacturer of brick of that city. The machine is set in a pit, and it is described as having a class of moulds linked together to form an endless chain, pressed beneath the pug mill whence they pass to the presser. The machine can be made of varying capacity, the one working at Nashville, being equal to 60,000 bricks per day. Mr. Lesueur has associated himself with Mr. John D. Anderson, and they are organizing to introduce the invention throughout the United States.

World says: Few steam fitters or engineers understand the valuable properties of graphite in making up joints; this valuable mineral cannot be over-estimated, in this connection. Indestructible under all changes of temperature, a perfect lubricant, and an anti-incrustator, any joint can be made up perfectly tight with it and can be taken apart years after as easy as put together. Rubber or metal gaskets, when previously smeared with it, will last almost any length of time, and leave the surface perfectly clean and bright. Few engineers put to sea without a good supply of this valuable mineral, while it seems to be almost overlooked on shore.

A construction detail that is gaining much popularity in some Western cities is the bricking in of frame houses. The building is sided up with matched stuff, as if complete, then a brick face wall, four inches thick, is laid in contact with the exterior, tied on by spikes about every sixth course. A boy distributes them all around on top of the wall. They are laid in the mortar-bed ready and driven through into the siding till the heads are flush with the face of the wall, when the next courses are laid, and so on. The walls present the appearance of solid masonry, are durable, and, as they add to the warmth of the buildings, seem to present substantial recommendations, especially for severe climates.

At the instance of the Belgian Minister of Public Works, Messrs. Boudin and Donny have investigated the subject of rendering wood fire-proof. They report that the resistance of wood to heat may be considerably increased, though absolute non-combustion cannot be secured. The resisting material must take the form of an injection into the fibres of the wood or of a coating; and it must be not too expensive, non-corrosive, speedy in becoming fixed, easily applied, neat and unalterable. An injection of a concentrated solution of phosphate of ammonia is recommended as the best treatment for small pieces of wood; but a more generally available plan is coating with cyanide of potassium or asbestos paint.

Sir Frederick Bramwell concludes an address before the British Association on "The Glories of Modern Science," by saying:—"To what and to whom are these meritorious prime movers due? I answer: To the application of science, and to the labors of the civil engineer, using that term in its full and proper sense as embracing all engineering other than military. I am, as you know, a civil engineer, and I desire to laud my profession and to magnify mine office; and I know of no better means of doing this than by quoting to you the definition of "civil engineering," given in the charter of the Institution of Civil Engineers, namely, that it is "the art of directing the great sources of power in nature for the use and convenience of man."

A CRITICISM OF THE PROVINCIAL ART SCHOOLS.

Editor CANADIAN ARCHITECT AND BUILDER.

THROUGH reading the daily papers I became aware that the prizes and certificates won by the students of the Toronto Art Schools were presented by His Worship the Mayor to the successful candidates in the theatre of the Normal School, on Friday afternoon, Sept. 27th.

There was not a large attendance of spectators or students, especially of the former. Neither were many of the prize or certificate winners present—I understand not more than one in ten. This is deplorable, and shows that there is something radically wrong with the school. That there should not be many present outside of those directly interested in the school, is not surprising, and does not call for comment. The public is usually apathetic and indifferent towards any movement unless it promises some possibility of materially enriching them. Dollars and cents is the great force of the present day, and it is therefore not surprising that but few of our citizens thought it worth while to be present at this meeting to give some encouragement to Art. But that there should have been so few of those who had won honors calls for some explanation. I can think of only three reasons for so poor an attendance of those directly interested: First, that the meeting was held at an inconvenient season, and that it was impossible for them to be present. Second, that they were so overcome by hashfulness that they would rather stay away than be formally presented before strangers with the prizes they had won—they might have come, for strangers were few. Third, that the students take so little interest in their work, have so little enthusiasm, that they did not consider it worth the trouble to be present on such an occasion.

That this school is not the success that it should be, and might easily be, is evident in more ways than one. Those at its head lamented that there were so few students in attendance; that instead of two hundred there should be at least one thousand; that there is much better attendance in the smaller cities. To my mind instead of lamenting, the directors should be thankful that there are so many in attendance, considering the condition of the school. The poor attendance is undoubtedly caused by the indifferent work the school is doing, which is the result of the incapacity of the directors, and of the ignorance of Art on the part of the teachers.

This Art School was first established by the Ontario Society of Artists, in their old quarters at 24 King st. west. By ceaseless efforts the society, with the assistance of the teachers, made the school a great benefit to the city. It had a large number of students, and what was of more importance, it had instilled in them an enthusiastic love of Art. The school grew so rapidly that the King street quarters became too small, and it was obliged to remove to the Normal School building, where it has by degrees come under the influence of the Education Department. That it has not thriven under the Department's administration, does not require proof. The drawings which have been exhibited with so much laudation of the work of the school, so much noise about the influence of Art, and so much unnecessary information about the lack of Art in Canada, and the necessity of Art institutions and training, prove most conclusively that the school is not accomplishing the work for which it was established, and which it should do. Notwithstanding that the school does not teach Art, and that its directorate und teaching staff are entirely ignorant of Art, a person would be led to believe by the upholders of the school, that outside of the Art Schools there is no Art in Canada. We are persistently informed that we are without artists, and that to the United States we must apply if we want artistic work. The truth is that we have more love of Art and better artists in our own land than have the States, when due allowance is made for the difference in population and wealth. Wealthy men buy works of art more often because pride and jealousy urge them, than because they have any love or appreciation of the beautiful. We may therefore say that it is wealth that encourages Art, and that alone. Because the States have accumulated a large amount of wealth, rather than because the people are artistic, they have become possessed of artists of which they may well be proud, and whom we should admire. But when it comes to belittleing ourselves and worshipping fourth and fifth rate men, because they are residents of the States, it is too much for us to quietly submit to. It certainly tends to show little knowledge of Art on our part as a people. But after all, is it the people? Is it not those among us who, having little or no knowledge of Art, and having become possessed of some wealth, are now attempting to impress us with their assumed and fictitious love of Art? Then again, there are those amongst us who, recognizing that it is the fashionable thing to be artistic, and being possessed of little knowledge of Art, and aware of the fact, are trying to hide their ignorance by loud statements of our lack of Art and the necessity of Art training. I imagine that some of these people have obtained control of the Art School of this city.

How does it come, that in a school established and supported by the Ontario Society of Artists until it had become firmly established and was doing good work, there is not now a single member of that Society connected with the school in any way whatever. The Society has received the cold shoulder, and no mistake, simply because it could not look at Art through the spectacles of the Minister of Education and his satellites. The teachers who were members of the Society were all compelled to resign one by one, disheartened and disgusted with the treatment to which they were subjected by the "book artists" of an hour, whose ideas of Art never rise above the plates in a medical work, who have been placed in control. These teachers had been teaching not for the pittance which they received, but out of love for their art. They were not dependent on what they received; *they* were conferring the favor, and when they were treated as so many puppits who must obey the governing body or leave, they resigned with sad hearts, and left the school to the tender mercies of those whose Art knowledge is not sufficient to distinguish good Art from the wretched stuff which is put forward as artistic by those who are masquerading as artists. I do not know who the present teachers are; they may be thorough artists for all I know of them personally, but I do know that the work of their pupils is bad, wretchedly bad, and that is sufficient in my judgment to condemn them as incompetent. Copies or drawings of very inartistic work are supplied to the students. A copy of a good piece of wrought iron work, for instance, will cost no more than a copy of the worst piece of work that ever left the hands of a blacksmith. The fault must therefore be with those who select the copies, and they must be devoid of all artistic faculties, or they would be able to distinguish between copies of good and bad work.

That an attempt has been made to run the school under machine regulations is evident, and however well it may answer for the common schools of the country, it will not do in our Art Schools. The teachers must be allowed sufficient latitude to develop such courses of training as will interest their students in their work. There must be enthusiasm, for without it everything becomes dull, lifeless and discouraging.

I am of those who believe that more depends on the individual qualities of the teacher and the influence that he can bring to bear on the pupil to interest him in his work, than in any quantity of dull routine work done under set regulations, which kill all individuality and do not make allowance for the very different temperaments of the pupils. Is it any wonder that the Art Schools have suffered tremendously under such a system, and is it not possible that our common schools will likewise suffer? Teachers cannot be made to teach as if they were machines, without injuring them as men, and the system of which they are without doubt the most essential part, if not the whole. An attempt to teach with the object of giving practical training only, must always result in failure, where no instruction in general principles is given. Students should be taught in a manner that will broaden their views, make them reason, and thoroughly study the requirements of any work on which they may be engaged, that what they do may as nearly as possible fulfil the conditions. Nothing good can result when a student is hurried along on superficial instruction in special designing, even though it may be very practical. He will almost to a certainty do any designing which he may attempt along mechanical lines, not having had his reasoning faculties expanded by instruction in the principles he should follow, while leaving him free to exert his individuality. All instructions and training should be with the object of developing the individual without sacrificing his individuality. There is sufficient machinery in the world at present, and if not, more can be manufactured. It is not necessary, therefore, to train members of the human race down to the grade of machinery—for too many are now, of their own free will, machines to all intents and purposes. It may be necessary to give some mechanical training to certain classes, but certainly not to students who are to be the designers of the future, more especially if their work is to be artistic, and consequently refining and ennobling.

I am not opposed to Industrial Schools; in fact I am a strong supporters of them, but I desire to support schools which are truly industrial, and not something else. The sort of industrial training which should be encouraged is the teaching of drawing to such an extent that the pupils of the school will be both able to understand drawings of work which they may be called upon to execute, and make drawings of any work—where drawings are not supplied—and they will facilitate the execution of the work. I do not believe that it is the duty of the Government to make the pupil a trained artisan in any particular calling. If the Government will give a good foundational course of training that will start the student in the right course to perfect himself in his chosen calling, it is doing all that any Government should do. If the means are supplied whereby the student can gain the information necessary to him, he should be called upon to make some effort for the enrichment of himself in the knowledge of his trade or art. That a school such as we possess, or for that matter, any school, can be made to turn out competent designers, is impossible. The time necessary for such perfection would be badly spent indeed, if spent in a school, no matter how good. A man will learn ten times more in one year at his trade or art in the workshop, than he will in the same time spent at any school, provided he has first the knowledge which it is the place of an industrial school to impart. The designing taught at schools where they strive to be very "practical," is such that the student must unlearn it before he will be of any service in the manufactory. It is mechanical to a degree that is simply ruinous to anything like good work. It is a thousand times better to teach the principles of design and the different methods of artistic expression, than to attempt the impossible and strive to turn out what are called "practical designers!" If turned out at all, they will be like so many machines—their designs will be lifeless, inartistic and valueless, but very possibly not harmless, as some may be lead to look upon them as the production of artistic training, and consequently to be admired.

There is nothing gained by attempting much and failing; more benefit will result from attempting little and doing that little well and along correct lines. One good teacher is better for a school than ten or any number of inferior ones; but above all things, the principal teacher should be capable and enthusiastic. An incapable at the head of an Institution will be its ruin, and that, I believe is the position of the Toronto School of Art.

Where are all the capable teachers that were once in this school Gone? And why? Because they were lovers of Art and not mechanical puppits willing and ready to jump at the command of "practical" ignorance, incapacity and conceit. There is such a thing as being so practical, as well as so artistic, that nothing good or beneficial results. Is it not better to err on the artistic, poetical and pleasurable side of life, than on the practical, the mechanical and gloomy side? Will not the human race be better with a little more joy and happiness, than with more energy and drive? Does not the great wealth of the few, and the abject poverty of the many, prove that there is too much hard-headedness and energy, and too little kindly consideration one for the other, and desire to give and obtain happiness? Would it not be better to seek knowledge to gain contentment and refinement, than to gain wealth and the pride of wealth.

After all, would it not be better to teach Art in an Art School for its refining influence, rather than attempt to train pupils who are indifferent to their future some specialty that they may gain a livelihood? Would it not be better to have industrial classes to teach the hard and dry knowledge required by mechanics in a way that will be useful to them, without any pretence of teaching them something else?

We want both Art Schools and Industrial Classes conducted by those who have a knowledge of the work entrusted to them. What we do not want are Art Schools degraded until they do not teach art, and too important in their own conceit to give industrial training that will be of service to the mechanical classes.

The Toronto Art School must be taken from under the wing of the Education Department and allowed to breathe the air of independence. The freer the Art Schools of the Province are, the better the work they do. The one at Ottawa, from all accounts, leads the Art Schools of the Province; and we understand that there the Minister of Education was not allowed to interfere with its management. If he had been, the Toronto school might not now be the most inefficient in the Province. The Toronto school should be placed under the management of men having some artistic training, and who will have sufficient firmness to resist all efforts which may be made to effect its ruin under any and all disguises. Teachers should be selected who have a knowledge of Art, and are capable of teaching it. If without certificates from Art Schools, so much the better. There have been too many teachers in the past with certificates from schools of somewhat similar standing to the Toronto school, for its good. Teachers without certificates, but with artistic ability, would be a change, and should work wonders. Let us try this innovation.

I am glad to see that some members of this year's Board of Directors have come to the conclusion that they are not the men to manage an Art School without the assistance of the artistic talent of the city. There are many good men on the Board of Management, but they have not the information nor experience necessary to successfully control an Art School. The direct management of the school should rest with a committee of artists, but there should be a general board, with many interests represented, to control the committee and provide funds for the proper working of the school. I am not confident that this will come to pass—I hope it will—but such a radical change will not meet with the approval of the Minister of Education, as he insists on being the controlling power in all things, both great and small.

Let us hope that the men now on the Managing Board who recognize that the school is not what it should be, will not cease their efforts of reform until they have relieved the school of the load of official incapacity which has weighed it down into the mire of utter uselessness.

Yours truly,

ANTIPATHY.

STONE-CARVING.

A great deal of the ornamental stone-work, which has been done in some of our best building in recent years, has been cut after the stone was in position. This is common, indeed, in the larger cities. Within a short time this process was rare. We can remember in 1873 that in Boston the practice was only then coming into general use. It was introduced by a number of architects who had studied abroad. At that time in a number of cases it was more of a fad than a necessity as considerable stone cutting was done in the building which might better have been done elsewhere. But as the general character of the design changed, work of this kind became more rational. Though in some cases, as at the present time, it was carried to an unwarrantable extent. The practice of stone-carving was probably developed most fully in France, where an extended use is made of the soft Caens stone. There the moldings, as well as the more ornamental carved and decorative portions are worked out on the building. It is quite absurd to do this to its fullest extent in the case of granite, hard limestone and even brown sandstone, as was done to a certain extent in the East several years ago. Certain carved and highly decorative portions can best be done after the building has been finished otherwise. But a mere mania for imitating foreign methods, without the exercise of reason, is absurd indeed. Some of the foreign methods of building are better than ours. Some of them are not so good. If we can only use sense enough to discriminate we will be fortunate indeed. The extremes of patriotism or mania for foreign imitation are alike unsatisfactory. We remember a visit to Trinity College at Hartford, a few years ago. They had some very beautiful buildings after the designs of Mr. Burges, the English architect. They have his work in all its beauty, but they had not imported the English climate; they had the same old New England climate with English windows, sashes and English grates. We were in a number of student's rooms and found them cold and miserable. There is nothing better than the American windows for the Northern American climate, particularly that of the colder portion. The English windows are suited to the English people and their climate. This illustration is used for the purpose of its general application in all details of building work. In the matter of stone-carving there is no need of doing it in the building merely because some one else does it. It may be done because there is a good reason for it. Under certain conditions the reason may not exist. Mere imitation is a sign of decadence.—*Stone.*

Wood may be inlaid with other woods, with bone, ivory, tortoise-shell, mother-of-pearl, and other shells, with metals, with marbles, with precious stones, with glass, pottery, china, or enamel, either plain or in pattern, says Prof. C. Aitchison, A. R. A., in a lecture on decoration before the society of arts, London. Living as most of us do in hired houses, we hardly think of anything but painted deal, the painting being renewed every few years, according to the caprices of fashion. Modern inlaid woodwork most of us have never seen; what we take for it is marquetry—two veneers of different colors cut into the pattern wanted, and one fitted into the other, and the whole glued on to a backing. Inlaying is sinking out the solid wood and letting in pieces of other colored materials, and requires much greater care and skill than marquetry. There are said to be only five men in England who are first-rate at marquetry, and most of them are foreigners. The main merit of real inlay is this, that at the worst the inlay can but come out, while veneer, if it gets damp, or if the glue gets too dry, comes off bodily. Very few people appreciate the value of hard wood, which has the incidental merit of not bruising so easily as soft; but its main merit is preserving the decorative color originally designed, and that it can be inlaid, or if carved, is not spoiled by successive painting. Oak is mostly our highest ambition. The mediævals and the people of the last century were quite right to plaster and paint, or to gild it, for new oak is one of the vilest colors—a sort of cross between cold veal and a top-boot. If not French polished, it may get a decent color in the days of your great-grand-children, though when new it does not make a bad background for inlays of ebony, other colored woods, and ivory. Spanish mahogany also looks well when it is about a century old, and is then a blackish purple. For dignity nothing is so serviceable as ebony, or wood stained black. Ebony varying from black, through brown to yellow, or through grey to black, has the inestimable advantage of variety, which dyed wood mostly wants. In this respect it is like real black marble, that is rarely without variations to gray or brown, and more often then not has white flecks or veins in it, so that you do not mistake it for enameled iron or slate. [Specimens of marquetry shown.] The parquetry of floors may be equally well inlaid in patterns, only it wants to be done on a larger scale.

HINTS ON VENTILATION.

IN ventilating—say a bed room—by means of the window, what you may principally want is an upword blowing current. Well, there are several methods of securing this without danger of a draught:

1. Holes may be bored in the lower part of the upper sash of the window, admitting the outside air.

2. Right across one foot of the lower sash, but attached to the immovable frame of the window, may be hung or tacked a piece of strong Willesden paper—prettily painted with flowers and birds if you please. The window may then be raised to the extent of the breadth of this paper, and the air rushes upward between the two sashes.

3. The same effect is got from simply having a board about six inches wide and the exact size of the sash's breadth. Use this to hold the window up.

4. This same board may have two bent or elbow tubes in it, opening upwards and into the room, so that the air coming through does not blow directly in. The inside openings may be protected by valves, and thus the amount of incoming current can be regulated. We thus get a circulating movement of the air, as, the window being raised, there is an opening between the sashes.

5. In summer a frame half as big as the lower sash may be made of perforated zinc or wire gauze and placed in so as to keep the window up. There is no draught; and if kept in position all night, then, as a rule, the inmate will enjoy refreshing sleep.

6. In addition to these plans, the door of every bed room should possess at the top thereof a ventilating panel, the simplest of all being that formed of wire gauze.

In conclusion let me again beg of you to value fresh air as you value life and health itself; while taking care not to sleep directly in an appreciable draught, to abjure curtains all round the bed. A curtained bed is only a stable for nightmares and a hotel for a hundred wonderills and ailments.—*Cassell's Magazine.*

SANITATION LIGHT AND HEAT.

SOME POINTS ON SEWERAGE, WATER SUPPLY, AND THE CONSTRUCTION OF A HEALTHY HOUSE IN A COUNTRY TOWN.

By David B. Dick, Architect.

[concluded.]

THE danger of gases from the sewer entering the house drain was recognized after a fashion, and was sought to be avoided by building a large cesspool between the house drain and the street sewer. Experience, however, showed that the filthy reservoir, which is what it really was, did not serve its purpose, but gave off its own dangerous emanations into the house drain. It was then sought to bottle these up in the soil pipes by putting a trap under each fixture. It was then supposed that all that human ingenuity could do to render plumbing safe had been done, and that if people still died of zymotic diseases, it was a dispensation of Providence which had to be submitted to, but for which there was no remedy. The clergyman was called in, when the man who was really wanted was the sanitarian, whether doctor, or engineer, or plumber—no, not plumber, he had already done all he knew; for the sanitary plumber has been an evolution of recent times. There were two reasons why these traps failed to do what was expected of them: First, the pipes were made of poor and light materials, and if air-tight when first put up, soon became corroded and full of holes, especially if of iron, but lead was little better. I have seen a piece of lead soil pipe with a large piece eaten out of it by rats. When pipes were put in, no test was applied to discover whether they were air-tight. That was taken for granted. The second reason was that the traps became unsealed. Every one knows that a trap is useless unless the bend is kept full of water. Now, although traps had been in use for generations before anybody discovered the fact, it is not only very easy to unseal an ordinary invented trap, but it is very difficult to prevent its becoming unsealed. When a quantity of water is poured quickly down a soil pipe, it drives the air in the pipe before it, and causes a vacuum behind it in the same way as the plunger of a pump does. According to the popular saying, "nature abhors a vacuum," therefore the air rushes in to fill it and take the place of that which has been driven down the pipe. But the only way by which it could get in was through the fixtures and the trap below them. Now that our eyes are open to the fact, we know what happened. The air in its passage carried the water with it out of the trap, leaving the trap, if not empty, at least unsealed, which amounted to the same thing. This is called syphoning the trap. There are several other ways in which a trap may become unsealed, but it is not necessary to enter into a discussion of these now. Enough has been said to show how untrustworthy the old traps were.

All this has been changed in modern practice. Pipes are now made of the materials and heavy enough not only to resist corrosion, which in calking joints in iron pipes is very considerable, and quite sufficient to split a thin pipe. But the most radical change has been in the entire abandonment of the old plan of trying to bottle up the sewer gas in the pipes. The objects aimed at now are: first, to make drains and soil pipes both self-cleansing, so that when properly flushed with water, no foul matter will lodge in them; second, to prevent the passage into the house drain of any sewer gas that may form in the street sewer, by interposing an efficient intercepting trap; and third, to have a current of fresh air passing at all times through the whole of the pipes in the house. This is attained by putting on the house drain, just above the main trap, a pipe which admits fresh air to the house drain and soil pipes, and by carrying the main soil up through the roof, having the end of it open.

The air in the soil pipe inside the house being generally warmer than that outside, naturally ascends the passes out at the top, as cold air enters by the fresh air inlet at the bottom. If, when water is passing down the pipe, the air is driven before it, no harm is done, as the current of air is simply reversed for the moment and a puff of air will ceme out at the inlet, after which the normal upward circulation of the air is immediately re-established.

To guard against the danger of the traps being syphoned, a duplicate set of pipes is provided for supplying air to them. Each pipe has a trap taken from the top of it. These pipes are all connected together and either branched into the soll pipe above the highest fixture, so as to draw air down through its open upper end above the roof, or they are connected into a similar pipe, which is led up through the roof independently. These pipes prevents the syphonage of the traps, because, when a vacuum is caused in the soil pipe by the sudden passage of a bolt of water, the air to fill the vacuum is drawn down through these pipes instead of being sucked through the traps under the fixtures. This apparent complication of pipes looks rather intricate to the uninitiated, but the main principle is really very simple and easily understood.

To make assurance doubly sure, the whole system should be twice tested; first, by plugging the ends of the pipes before the fixtures are connected and filling them with water right up to the top, when any leaks will at once be detected by the water dribbing out. Secondly, after the fixtures are placed and connected and the traps filled with water, oil of peppermint is poured into the top of the soil pipe and volatilized by sending a pailful of hot water after it. If there are any defective spots through which sewer gas could escape into the house, the pungent odor of the peppermint will find its way out at these places, and any ordinary nose will very readily detect and locate them.

Some of the old fixtures, notably the pan closets, were very objectionable, because their construction was such that it was impossible to keep them clean. There is now such a variety of good fixtures for every conceivable purpose, and competition has made them so moderate in price, that there is no excuse for using an old-fashioned or bad one of any kind. Many are still made and sold which cannot be recommended as coming up to the standard of modern requirements. But those who are familiar with the subject have no difficulty in selecting good ones. Indeed, there is quite an embarrassment of riches. As a glance at the catalogue of a good manufacturer will show, there are so many good fixtures of all kinds, differing only in slight particulars which only an expert can appreciate, that one is sometimes tempted to wish there was not quite so many.

A soil pipe or drain should never, if it can be avoided, be buried under the floor of a house or closed in behind plaster. They should, if possible, be run along the cellar walls or suspended from the ceiling and run up in a corner of a pantry or bathroom where their appear ance need not be objected to. Every one knows they are there even when concealed, and a tastefully arranged and neatly executed piece of plumbing work is by no means an unsightly object. If it is absolutely necessary to bury a pipe under the floor, it should first be carefully tested and then covered with a good concrete floor, building small brick pits where necessary to give access to brass cleaning plugs, in suitable places to admit of any foreign bodies being removed from the pipes without tearing up the concrete. These foreign bodies will sometimes get into the pipes in spite of the utmost care on the part of the housekeeper. Children and domestic servants seem to have an unconquerable *penchant* for trying whether the plumbing system is able to assimilate sponges, wash rags and similar objects. I remember in one case of stoppage, being assured by the master of the house that his children and servants would never think of getting rid of any such thing in this way, but when the stoppage was reached, there were taken out, besides other thing, several of his neckties and a piece of one of his wife's corsets. When shown the collection, he could only exclaim, "well, well; I never could have believed it." But there they were. Sometimes the much abused plumber is blamed when anything goes wrong, when some such gross ignorance and carelessness as this is the sole cause of the mischief.

The advice which any sanitarian would give to anyone intending to put plumbing in his house, may be summed up very briefly: First, have the work arranged and carried out by some one who knows his business. Never entrust it to a tinsmith who takes up plumbing, which he does not understand, in addition to the tinkering which he does understand; second, have no more plumbing put in than you are prepared to pay for having done in thoroughly good fashion; third, see that your plumbing appliances are properly used after they are in.

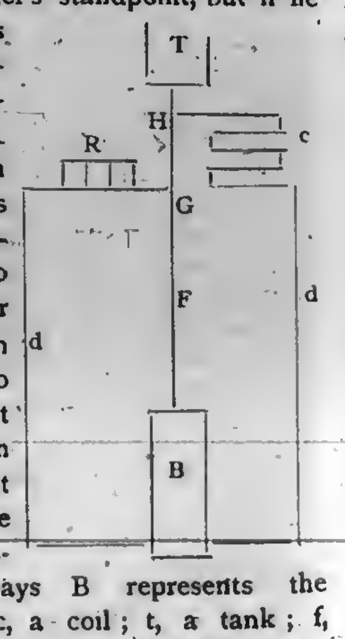
A concrete floor has just been incidentally mentioned. This is a most desirable thing to have under every house in order to keep down the damp ground air. For that reason it is desirable to have a cellar or basement under the whole of the house with a good concrete floor and the ground should first be underdrained if there is any appearance of dampness or any risk of surface water flowing towards the house. It is not an unusual thing to place a hot air furnace in a basement which has an earth floor that has been saturated with filth from leaky drains, and to draw the supply of air (to be warmed) from the cellar instead of from the open air by a proper closed duct. This is sometimes the arrangement which forms the last straw that breaks the camel's back and renders a house entirely uninhabitable until it is altered. It effectually destroys any chance of escaping from the effects of the defective drains, because the air which has been befouled by them is thus carefully collected and warmed and sent up through the registers to be breathed by the occupants of the house. No surer way could be devised of intensifying the danger arising from defective soil pipes and drains. Even if there is no plumbing or drains in the house at all, the air of the house should never be thus taken to be warmed and breathed over and over again. Every hot air furnace should be provided with a duct bringing in fresh air directly from out of doors and it ought to be brought from some point where it will be as free as possible from dust or anything objectionable.

A few of the most important points to be attended to in order to have a healthy house "with modern conveniences" as the agents say, have been very briefly touched upon. There are many others besides which any one whose interest in the subject is once fairly aroused will soon discover for himself. And no one need remain in ignorance of anything that affects his well-being in this connection. The literature of sanitary science is now ample and easily accessible, and there are few who would not feel themselves well repaid for devoting a portion of their spare time to its perusal.

HOT WATER HEATING.

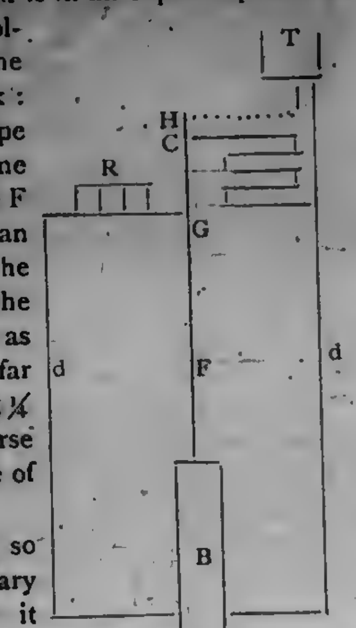
Editor Canadian Architect and Builder.

Sir,—I have had considerable experience both in the theory and practice of hot water heating, and have heard, and read many opinions both good and indifferent in reference to this subject, but never anything that seemed to my mind so utterly ridiculous as the statements in the opening part of the article which you extracted from the *Northwestern Architect*, and which appeared in your August number. The writer claimed that it was the contraction of hot water, and not the expansion of cold water by heating that caused circulation. If the writer has found this to be the case, he might have informed us from what hot spring he obtained his water supply, so that we who are toiling up the rugged road to perfection might follow in his footsteps, and so gain such a grand result that our fuel bill for heating would be nil. But we ordinary mortals find that when we fill our system, the water is as cold as the season of the year will allow, and before we can obtain circulation, it is necessary to heat the water, which then immediately rises to the highest point in the system and is replaced by the colder, (and therefore heavier) water. The theory may be all very well from the writer's standpoint, but if he tries to see his assertion as others see it, he will understand how ridiculous it appears. We must start by expanding the cold water, which will, of course, when it has accomplished its work, contract, and therefore decend to take the place of the warmer water. There is another item in the letter which seems to me to bear witness to the fact that the writer is deficient in the very first principles of hot water heating, and that is the drawing he has given to illustrate his theory.



He says B represents the boiler; R, the radiator; c, a coil; t, a tank; f, a flow or supply pipe, and d d return pipes. Now every person that knows the first thing about hot water heating knows that this represents a wrong construction. The tendency of water when heated is to rise, and the nearer the pipes through which it has to rise are to the perpendicular, the quicker will be its motion; and according to this construction the tank will rob to a considerable extent both the radiator and the coil, because there is nothing to alter the natural tendency of the water to rise, either at G or H, and the consequence is, that the water will flow direct into the tank. Another wrong assertion is, that the loss of bulk in the pipes did, will be made good by the tank. Now this is altogether impossible, because the hot water in F is rising as rapidly as it can, and how is the water in tank T going to fall (in opposition to the water rising in F) to H or G, which it will have to do if it is to supply the loss of bulk in d d.

The tank T should only be used for the purposes of expansion and feed, and in no way should it be expected to assist in the circulation of the system except when the boiler and radiators are on the same level; and where there is only one connection between the expansion tank and the system, it should be with the return pipe, and not the flow; but a small connection with the flow pipe may also be taken if the tank is in an exposed position to prevent freezing. The following sketch will illustrate the principle upon which I work: T is connected to return pipe d by a ¾ pipe, and the same size connection to flow pipe F at H, when the tank is in an exposed or cold position. The flow pipe F decreases as the branches are taken from it as follows: Say, 1½ inch as far as G, and from G to H 1¼ inches. This must, of course be determined by the size of the radiator and boil.



I would not have entered so fully into these elementary details did I not think it necessary to do so in replying to the article in question, as the writer of it seems altogether ignorant of them. In reference to his assertions about the large mains and returning the water to the bottom of the boiler, I will reply later on.

Tom.

HOT WATER HEATING.

Editor Canadian Architect and Builder.

Dear Sir,—In a recent issue of your paper I notice an article under this head, taken from the *Northwestern Architect*.

The writer of the article in question starts out with the statement that "the motive power which causes circulation in a hot water heating plant is brought into action not by the expansion of the water, but by its contraction. To make this clear," he says, "consider that the normal condition of the plant when in operation is with the hottest water in the place, and that what takes place in the natural starting of the apparatus is a changing condition. Let us then imagine the apparatus to be filled with hot water, and just enough fire to keep the temperature at the top of the boiler constant to be maintained."

In order to explain his new and somewhat crude theory as to the circulation of hot water, he shows a system of pipes and connections, which would never be fixed by any good mechanic who understands hot water heating.

He assumes that the apparatus is filled with hot water, and then notes the changes that take place.

Circulation of hot water is not caused by its contraction, as stated, but it is caused by its expansion.

Take a hot water heating apparatus with its pipes and radiators filled with cold water. Water consists of an innumerable quantity of extremely minute particles, called molecules. These particles have the property of being able to glide over, under and to or from each other almost entirely without resistance or friction.

The action that takes place in a boiler is this: When the heat is applied, the particles nearest the heated surface become expanded or swollen, and are so rendered lighter (bulk for bulk) than their colder fellows, they are therefore compelled to rise to the highest point in the boiler; finding an opening there (the flow pipe,) they travel up this also, until the highest point in the circulation is reached. It will be understood that immediately the expanded particles left the heating surface, other cold particles immediately took their places; these become heated in their turn and rise, following their predecessors, and so it continues.

The circulation can be described as a stream of heated particles flowing up one pipe from the boiler, and a stream of cooler particles flowing down the other into the boiler; or it might be defined as a means of automatically transporting heated water from the lower to the upper parts of a building, and providing a down flow of cold water to the boiler, to be heated in its turn.

This circulatiod goes on indefinitely as long as any fire remains, and even for several hours afterwards, until an equilibriumn has been established between the two columns of water.

I entirely agree with the remaining portion of the writer's article wherein he speaks of the slipshod manner in which too much of the work is done nowadays. But while this is unquestionably true, it is equally true that there is such a thing as a taste educated or trained away from the right course by the pernicious influence of depraved familiarity. As Pope expresses it:

"Vice is a monster of such frightful mein
That fo be hated, needs but to be seen;
But seen too oft, familiar with her face,
We first endure, then pity, then embrace.

Yours truly,
W. B. Francis.

AMERICAN GAS LIGHT ASSOCIATION MEETING IN TORONTO.

A CONVENTION of members of the American Gas Light Association will be held in this city commencing Wednesday, the 17th inst., at 10 o'clock, and closing on the evening of the 20th. The meetings will be held in Temperance Hall. The programme will include the reading of the following papers:

"Experience in Distributing Gas Under Extremely Low Temperatures," by D. H. Geggie.

"Observations During Many Years' Experience in the Gas Business," by Jas. R. Smedberg.

"Construction of Gas Holders with Wrought Iron or Steel Tanks Above Ground" by Frederick Mayer.

"The Steam Stoker and Improved Charger," by A. Q. Ross.

"Daily Experiences and Observations of a Gas Manager," by Jas. Somerville.

"Coals for Gas Making," by Jas. D. Perkins.

"Enriching Gas with Naphthaline," by Arthur Kitson.

For the Question Box there are the following questions:

"What is the exact cost on wear and tear of meters where iron purification is used?"

"What is the best way to treat men who, while working in a trench, are overcome by gas?"

We bespeak for the members of the Association a hearty welcome to Toronto, and trust that their stay amongst us may prove both pleasant and profitable. The quickest way we know of to win the affections of the people of Toronto would be to tell them how to regulate the pace of their gas meters.

SANITATION IN ENGLAND.

UNDER the new English Registration Bill, the sanitary arrangements to be certified are to be in accordance with the following requirements:

(1.) Each water-closet shall have a flushing service which shall be distinct and separate from every water service other than a water-closet service, and no cistern shall be connected with any pipe which is in direct connection with a soil drain.

(2.) Each soil pipe shall be ventilated, and the open end of the ventilating pipe shall be at least two feet above the highest window or other opening on the side of the building where the pipe is situated.

(3.) The drains shall be ventilated by means of a soil-pipe, or by a separate pipe above the highest window on the side of the building where the pipe is situated.

(4.) Water closets shall be trapped, and they shall be the only arrangements inside the building having pipes directly connected with a soil drain.

(5.) There shall be an air chamber, with disconnecting siphon trap, which shall be easy of access, on the soil drain between the buildings and the public sewer or cess pool.

In addition to these conditions, every certificate for a building used or to be used as a hospital shall specify the cubic contents of each ward, and set forth in detail the provision made for lighting, warming and ventilating each ward as well as the entire building, and the position of the water closets, sinks and discharge pipes with reference to the wards.

Buildings must not be used without being certified to, under a penalty of £10, and £1 for every day of such occupation, to be recovered of the owner, lessee or occupier. The certificates lapse in five years and must be renewed, as in case of any alterations made during that time.

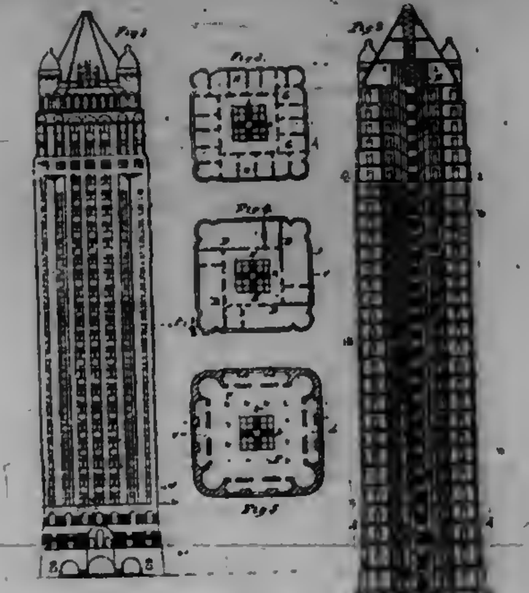
Continued pumping at a well lowers the ground water level in the earth for a distance of from 100 to 1,000 feet, varying with geological formation and the water-supply. Hence, the greater amount of water taken from a well, the greater distance is the water drawn through the earth and the greater the chance for pollution. —*Owosso Water Report.*

In a recent lecture to the Sanitary institution of Great Britain, Dr B. W. Richardson considered the power the human body has been proven to possess of storing up life to a prolonged period. He stated the conditions favoring such a storage in the following order: Hereditary qualifications, the virtue of continence, maintenance of bodily functions, perfect temperance and purity from implanted or acquired diseases. Temperament has its influence, the bilious and sanguine temperaments being best for long life and the best for long life and the nervous and lymphatic the worst. What he termed all-round temperance is the avoidance of everything that stimulates the heart beyound its natural activity, such stumulation being an unnatural tax that reduces the storage of life.

MANUFACTURING MATERIALS.

Iron Building Construction.

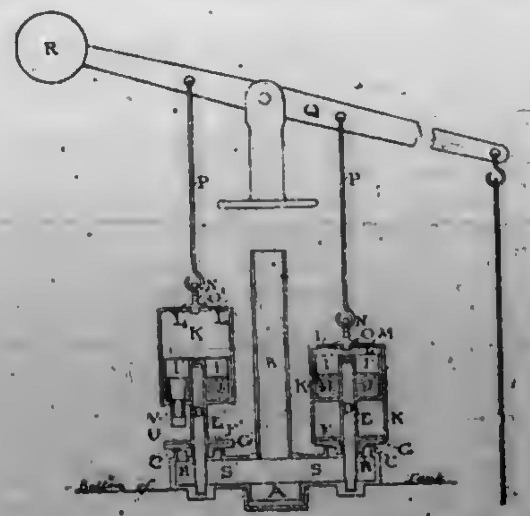
No. 29,533. Leroy S. Buffington, Minneapolis, Minn., U. S., dated 23rd July, 1888.



Claim.—1st. A building having a continuous skeleton of metal, a covering or veneer, and a non-conducting packing between the skeleton and veneer, for the purpose set forth. 2nd. In a building frame, a continnous diminishing laminated post formed of layers of metal plates, secured togther and arranged to break joints and decreasing in number towards the top. 3rd. In iron building construction, the combination, with a framing composed of continuous laminated posts suitably connected by braces, and girts of tie-beams secured thereto and to one another, substantially as set forth. 4th. In iron building construction the combination, with a framing composed of continuous laminated framing posts, suitably connected by braces, of an exterior covering of non-conducting material, for the purpose set forth. 5th. In iron building construction, the combination, with a framing composed of laminated posts suitably connected by braces and girts, of an exterior covering of non-conducting material, and a stone or other veneering exterior thereto, and supported on shelves secured to the framing, substantially as set forth. 6th. In a frame for a building of two or more stories, a series of tapering posts extending from base to top of the frame, and formed of metal plates in layers, secured with their flat slides together, and arranged to break joints and braces and girts, for connecting and securing the posts, substantially as set forth. 7th. In a building frame, a series of continuous framing posts, composed of metal plates secured with their flat sides together and breaking joints, in combination with girts and tie-beams secured thereto at each floor, substantially as set forth. 8th. The combination, with the laminated plates, of the continuous girts secured thereto, and the tie-beams also secured thereto, and to one another, substantially as set forth. 9th. The combination, with the framing posts and braces, of the wire-lath, or other suitable coverings, the non-conducting packing and the veneering the purpose set forth. 10th. The combination, with the building supported by the shelves, and anchor rods, substantially as and for frame composed of the laminated posts, girts, tie-beams and pillars arranged to form a central well, of the elevator shafts, and stairs arranged therein, substantially as set forth. 11th. The combination, with the building frame constructed with a central well, of elevator shafts arranged in the corners of such well, and flights of stairs rifing from opposite sides of such well to a central landing, and other flights rising from said landing to the other sides of such well, substantially as set forth. 12th. The combination, with the posts and girts forming outer frame, of the beams having their outer ends resting on the girts and secured to the posts, and their inner ends secured to beams that are transverse to them, the pillars therefor, and and the diagonal tie-rods, substantially as set forth. 13th. The combination, with the posts and girts, of the angle-plates connecting them, and forming supports for the veneer shelves. 14th. The combination, with the posts and their braces, of the plates forming the shelf supports, the shelves, the veneer and the anchor rods, substantially as set forth.

Flush Valves for Water Closets.

No. 28,790. Thomas Campbell, St. John, N. B., dated 3rd April, 1888.

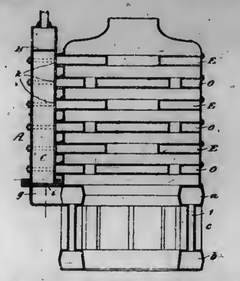


Claim.—1st. The combination of the cylinder K and the piston I, substantially as and for the purpose hereinbefore set forth. 2nd. The combination, with the two cylinders K, K1, and the

pistons I, I1, substantially as and for the purpose hereinbefore set forth. 3rd. The combinations of the cylinders K, K1 and the pistons I, I1, with the rods P, P1, as connected with the lever Q and the chain T, substantially as and for the purpose hereinbefore set forth.

Hot Water Radiator.

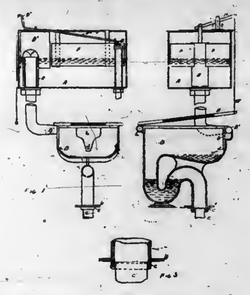
No. 28,923. Eugene S. Manny, Montreal, Que., dated 16th April, 1888.



Claim.—A hot water radiator, composed of a certain number of vertical hollow double independent sections A, mounted on a double hollow corresponding horizontal base B, by means of bolts C, and provided with a system of air tubes O, P and valve Q, the whole as above described and for the purpose set forth.

Water Closet Apparatus.

No. 29,526. David S. Keith and Alexander Keith, Toronto, Ont., dated 23rd July, 1888.



Claim.—1st. As an improvement in a water closet apparatus, the cistern A containing a syphon E which is operated by the depression of a mass D, or of a mass F F in the water, as herein described, and for the purpose specified. 2nd. The improvement in a water closet apparatus which consists of hinging the seat M to lugs L formed in the ware of the closets, and connecting the seat M to operate the action of the syphon cistern, as herein described and for the purpose specified. 3rd. In a water closet the fan b having an opening above the level of the water in the basin, and pointing towards the centre of the bottom of the basin, substantially as described herein and for the purpose specified. 4th. In a water closet apparatus, the connection of the closet to the soil pipe C1, formed by the flange with the channeled recess C containing tar or other viscous matter, substantially as described and for the purpose specified.

Composition for Roofing and Carpet Felt, Straw Lining, etc.

No. 29,558. Thomas P. Bishop, Jr., St. Bazile, Que., dated 28th July, 1888.

Claim.—In the manufacture of carpet felt, roofing felt, and straw lining, the admixture with the ingredients of which these are now composed, of spent tan bark within the proportions of from fifteen to twenty per cent. as and for the purpose set forth.

PROPOSED NEW SEWER PIPE MANUFACTORY IN CANADA.

THE editor of the CANADIAN ARCHITECT AND BUILDER is in receipt of the following letter from a gentleman in the United States, whose name we withhold for the present, having no authority to make it public:

"I am thinking of establishing a manufactory for sewer tile, etc., in Canada, if I can find a clay suitable for the purpose, and I think I know where I can get it.

I write to you for information regarding the market for sewer tile, and to find out if the demand is at all good; also if there is any manufactured in Canada at present, and to what extent. I, of course, refer to a vitrified, salt glazed tile, and I understand the largest size at present manufactured in the country is six inch.

Any information you can send me on the subject will be thankfully received."

Upon receipt of the above letter, we instituted enquiries, with a view to obtaining the information sought for. We were informed by the principal dealers in sewer pipe in this city that a wide field lies open to the manufacturer of a first-class article in that line in Canada. There are at present two manufactories in Canada—one in Ontario, the other in Quebec. These, we were informed, supply but a very small percentage of the sewer pipe used in this country. The largest proportion is imported either from Scotland or the United States. We enquired whether it was owing to the limited capacity of the Canadian manufacturers to produce these goods that such a large proportion had to be imported. The answer was that it was due rather to the inferiority of the pipe at present manufactured in Canada as compared with the imported article. The city of Toronto, it was said, would not allow the use of the native article, and that one dealer alone imported into Toronto last year 200 car loads of drain and sewer pipe. We give these statements to the public as they were given to us, with no desire to injure in any way any industry at present in operation in Canada, but rather to point out to the proprietors of such the apparent necessity of improving the quality of their output, if they desire to supplant the manufactures of other countries at present used so largely in our public works. We also consider it a duty to encourage the establishment in Canada of manufactures whenever there appears to be a profitable opening for the same.

ENGINEERING MATERIALS.

I NOW desire, says Sir Frederick Bramwell, the eminent English engineer, addressing the British Association, to point out how, as the work of the engineer grows, his needs increase. New material, or better material of the old kind, has to be found to enable him to carry out these works of greater magnitude. At the beginning of this century stone, brick and timber were practically the only materials employed for that which I may call standing engineering work—*i. e.*, buildings, bridges, aqueducts and so on—while timber, cast iron and wrought iron were for many years the only available materials for the framing and principal parts of moving machines and engines, with the occasional use of lead for the pipes, and of copper for pipes and for boilers. As regards the cast iron, little was known of the science involved (or that ought to be involved), in its manufacture. It was judged of by results. It was judged of largely by the eye. It was "white," it was "mottled," it was "gray." It was known to be "fit for refining," fit for "strong castings," or fit for castings in which great fluidity in the molten metal was judged to be of more importance than strength in the finished castieg. With respect to wrought iron, it was judged of by its results also. It was judged of by the place of its manufacture; but when the works of the district were unknown, the iron, on being tested, was classed as "good fibrous," although some of the very best was "steel-like," or "bad," "hot-short," or "cold-short." A particular district would produce one kind of iron, another district another kind of iron. The ore, the flux and the fuel were all known to have influence, but to what extent was little realized; and if there came in a new ore or a new flux it might well be that for months the turn-out of the works into which these novelties had been introduced would be prejudiced. Steel again—that luxury of the day of my youth—was judged by the eye. The wrought bars, made into "blister" steel by "cementation," were broken, examined and grouped accordingly. Steel was known, no doubt, to be a compound of iron and carbon, but the importance of exactness in the percentage was but little understood, nor was it understood how the presence of comparatively small quantities of foreign matter might necessitate the variation of the proportions of carbon. The consequence was that anomalous results every now and then arose to confound the person who had used the steel, and, falsifying the proverb "true as steel," steel became an object of distrust. Is it too much to say that Bessemer's great invention of steel made by the "converter," and that Siemen's invention of the open hearth process, reacted on pure science, and set scientific men to investigate the laws which regulate the union of metals and metalloids, and that the labors of these scientific men have improve the manufacture, so that steel is now thoroughly and entirely trusted? By its aid engineering works are accomplished which, without that aid, would have been simply impossible. The Fourth Bridge, the big gun, the compound armor of the ironclad with its steel face, the projectile to pierce that steel face, all equally depend upon the "truth" of steel as much as does the barely visible hair-spring of the chronometer, which enables the longitude of the ship in which it is carried to be ascertained. Now, what makes the difference betweeo trustworthy and untrustworthy steel for each particular purpose? Somethieg which, until our better sense comes to our aid, we are inclined to look upon as rediculously insignificant—a "next-to-nothing." Setting extraneous ingredients aside, and considering only the union of iron and carbon, the question whether there shall be added or deducted one-tenth of one per cent. (pardon my clumsy way of using the decimal system) of carbon is a matter of great importance in the resulting quality of the steel. This is a striking practical instance of how apparently insignificant things may be of the highest importance.

In an article descriptive of the Montreal Terra Cotta Lumber Company's business, which appeared in the June number of this journal, an error occurred which we very much regret, and now desire to correct. The President of the Company is Mr. J. Barsalou, and the manager, Mr. W. T. Gayuon, not W. C. Evans, as erroneously stated in the article referred to. The company's works are at Maisonneuve, and their business office at 86 St. Peter street, Montreal. Our readers are asked to note the company's correct address, as given above, and correspond with them for full particulars of their terra cotta fire-proof building material.

Mr. Reuben Clarke, 59 Adelaide street east, Toronto, is the inventor and patentee of a new kind of sliding door hanger, which is superior in some important particulars to those heretofore used. Unless very carefully handled the ordinary sliding door will "stick," and prove itself to be a nuisance. This is owing to the fact that the door is hung entirely from the top. With Mr. Clarke's invention the door cannot hitch, being perfectly balanced and sliding on both top and bottom tracks. Another equally important advantage lies in the fact that it is put in separate from, instead of as a part of the building, and should any derangement of the building throw it out of perfect adjustment, the difficulty can be overcome without disturbing either the wall, carpet or furniture. Mr. Clarke has commenced the manufacture of his device, and invites correspondence and investigation from persons interested in building.

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

OSHAWA, ONT.—W. J. Hare will erect a foundry here at once.

KINGSTON, ONT.—Tenders will be asked shortly for the erection of the proposed dry dock.

OWEN SOUND, ONT.—The Methodist congregation propose to erect a handsome new church.

HALIFAX, N. S.—This city proposes to expend $10,000 in sewer extension and improvement.

LEAMINGTON, ONT.—Capitalists have in view the erection of a $50,000 hotel on the lake shore next summer.

PEMBROKE, ONT.—Pembroke will on the 26th December vote on a by-law to borrow $50,000 for waterworks.

ST. JOHN, N.B.—The Intercolonial railway will be extended along the harbor front if right of way is given.

TEESWATER, ONT.—A by-law to raise $9,000 for a system of waterworks has been adopted by 45 of a majority.

WIARTON, ONT.—A by-law appropriating $15,000 for the construction of waterworks was carried here on Oct. 10th.

AURORA, ONT.—The by-law to raise $3,000 for the extension of the Aurora waterworks was carried by a majority of 65.

STRATFORD, ONT.—The necessity for the erection of a hospital for this city is being pointed out, and doubtless action in that direction will soon be taken.

OTTAWA, ONT.—The Y. M. C. A. of Ottawa, are about to erect a $22,000 building.—The Chairman of the Waterworks Committee will receive tenders until the 31st inst. for the construction and erection of a set of pumping machinery. Specifications and drawings may be seen at the waterworks office, here.

QUEBEC.—An effort is being made to obtain a suitable site for a grand union passenger depot on the Cove field for all the railways entering the city.—A corps of engineers is making observations to ascertain the width and elevation of the St. Lawrence and record soundings of the river bed with a view to erecting a bridge across the river at this point.—A syndicate is said to have acquired ground near Dufferin terrace on which to erect a large hotel.

WINDSOR, ONT.—Health Officer Coventry, of Windsor, says Walkerville is bound to grow, and that sewage from that place will in time make the water lower down dangerously impure for use at Windsor. He favors a site above Walkerville for new waterworks buildings. A competent engineer will be employed to estimate the cost.—Foreign contributions to be applied to the building of the new hospital, Hotel Dieu, at Windsor, to the amount of $20,000 have been received by Dean Wagner. A site has been secured, and work will soon be commenced on the main wing, which will cost $30,000. The total cost of the building will be about $75,000.

TORONTO, ONT.—A by-law will be submitted asking $90,000 for new water mains.—Mr. A. E. Pauli, architect, is preparing plans for a new fire hall to be built on Ossington Ave.—Plans have been prepared for a Wayfarers' Home, to cost $10,000.—The following permits for the erection of new buildings have been granted by the Toronto City Commissioner since our last issue: Mr. Bryer, 2 blocks of six each 2 storey r. c. dwellings, 8 to 30 Davenport Road, cost, $6,000; Mr. Clark, 3 attached r. c. dwellings, Elgin street, cost, $4,000; Mr. T. Dowsdell, alteration to dwellings, corner Ontario and Wellesley sts., cost, $1,150; Brady & Bell, 2 attached r. c. dwellings, Walton st., near Terauley, cost, $2,500; Mr. H. H. Strathy, alterations to warehouse, 37 Front st., cost, $3,000; J. T. Shipter, pair s. d. 2 storey and attic brick dwellings, Carleton st., cost, $5,000; Mr. W. O'Neil, alterations to building, Adelaide st., east, cost $5,000; R. & T. Watson, 4 storey brick warehouse, Esplanada st., east of Church st., cost, $6,500; Mr. W. S. Thompson, pair s. d. 2 storey and attic brick dwellings, cor. Wilcox and St. George st., cost, $15,000; A. J. Mark, 2 pr s. d. 2 storey and attic brick dwellings, corner of Maitland and Church sts., cost, $25,000; Mrs. C. Verrall, 4 attached 3 storey and attic brick dwellings, Bathurst st., near College st., cost $16,000; Mr. Ben Heck, brick additional storey, cor. Duchess and Sherbourne st., cost, $1,500; Mr. John C. Crowther, 2 storey and attic brick dwelling, St. George st., south of Bloor, cost, $11,000; J. G. Goddard, 2 storey brick addition, cor. Front and Sherbourne sts., cost, $4,500; George Hastings, 2 storey bk. addition and alterations to 200 Simcoe st., cost, $2,000; Mr. A. Mitchell, pair attached 2 storey brick dwellings and alterations to store, Grange Ave., cost, $3,000; St. Joseph's Convent, brick stable and coach house, cost $3,000; W. G. Boon, pair s.d. 2 storey and attic brick dwellings, Murray st., cost, $3,000; G. C. Sheppard, one pair s. d. 2 storey and attic r. c. dwellings, Cumberland st., near Avenue Road, cost, $1,600; O'Keefe & Co., alterations to store house, Dalhousie st., cost $2,000; B. Rosman, alterations to brewery, Duchess st., cost, $5,000.—Those who have in hand the raising of funds for the erection of the new Victoria University building in this city hope to be in a position to let contracts for the work next spring.

PERSONALS.

M. B. Thomas, Superintendent of the Dundas gas works, has recently returned from a tour of inspection to various cities of the United States.

Hon. Mr. Smart, Minister of Public Works for Manitoba is reported to be dangerously ill of typhoid fever at Brockville, Ont.

Mr. Sandford Fleming, the well-known engineer, has returned to Ottawa after spending the summer at Halifax, N. S.

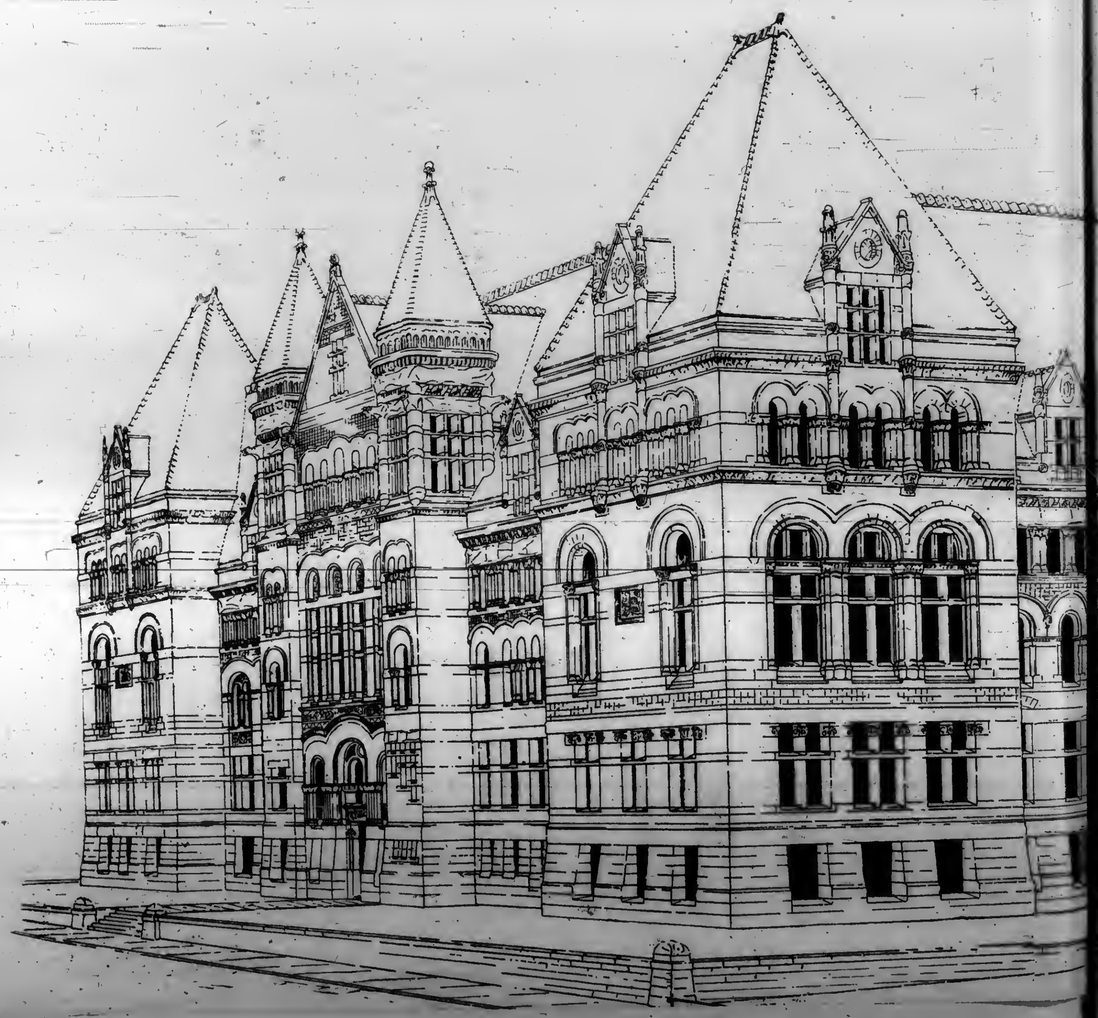
Proposed Court House and City Hall

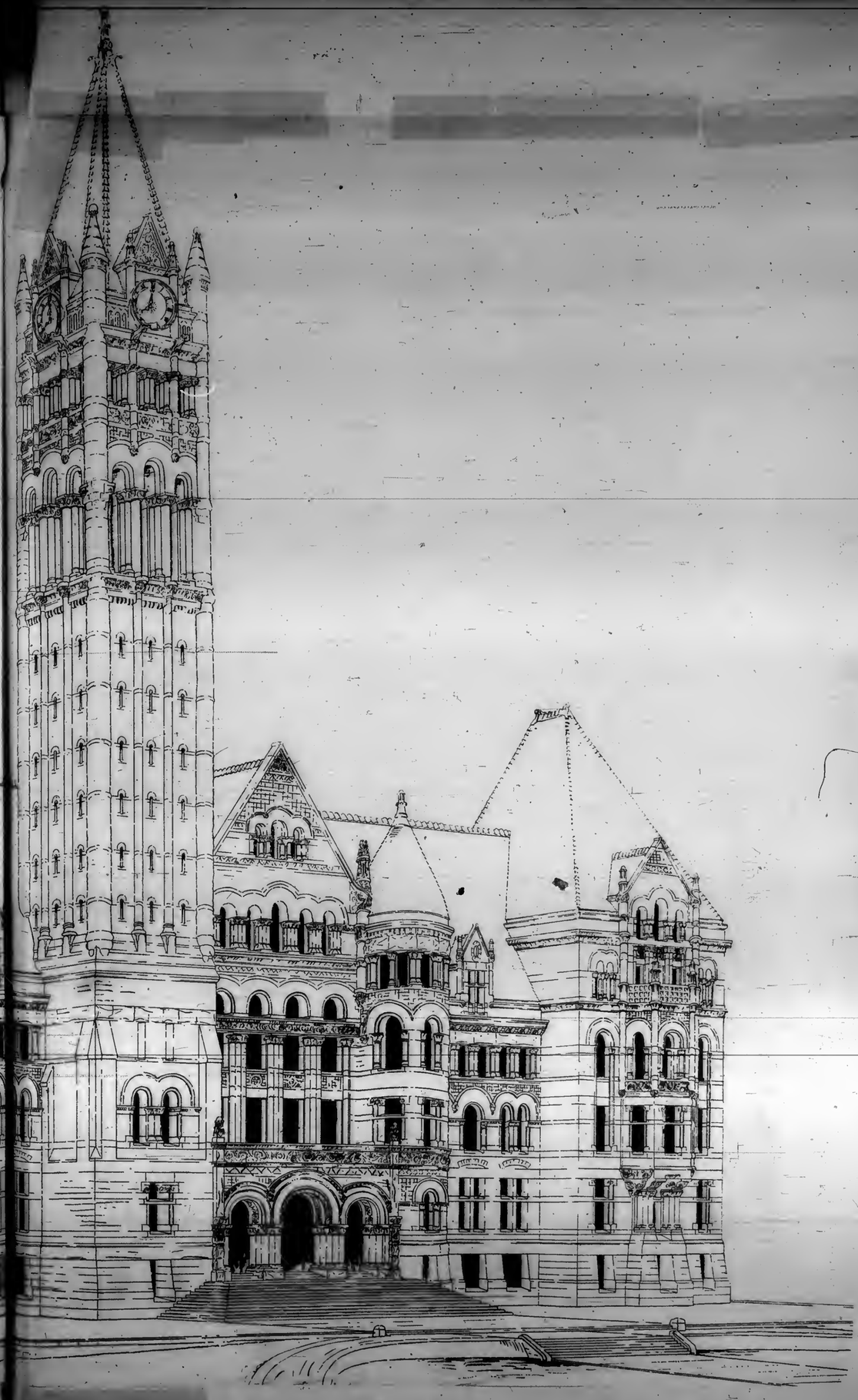
FOR THE

CITY OF TORONTO.

E. J. LENNOX, ARCHITECT, TORONTO.

Published and printed with No. X., CANADIAN ARCHITECT AND BUILDER, October, 1888.





PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No XI. TORONTO, CANADA, NOVEMBER, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

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C. H. MORTIMER, Publisher,

31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to subscribers in foreign countries, is $2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

TO OUR READERS.

The publisher of the CANADIAN ARCHITECT AND BUILDER has now in course of preparation "The Canadian Contractor's Hand-Book." This book will contain reference material of the greatest value to persons engaged in the erection and equipment of buildings or other structures. A copy of this valuable book will be presented to every new subscriber to the CANADIAN ARCHITECT AND BUILDER. As the book itself will be well worth the price of subscription to this journal, every contractor should take advantage of this offer.

AMERICAN architectural journals have recently commented on the small incomes usually derived from the practice of architecture, and to that fact have attributed the readiness with which some architects have abandoned their practice to accept positions in the civil service to which very moderate salaries were attached. The same state of things appears to exist in Toronto, if it be true, as stated, that among the applicants for the position of Street Commissioner (salary $1500 per annum), were a number of city architects.

THE Building Inspector for the city of Pittsburgh, Pa., appears to be the right man in the right place. He has determined that those who erect buildings shall first obtain permits, and is manifesting his determination in the right way, by instituting legal proceedings against persons who refuse or neglect to comply with the law. We are much in need of such a thoroughgoing official in Canadian cities. As we have more than once stated, the law which requires permits to be obtained before new buildings are commenced, is, as a general rule, disregarded. New buildings are frequently nearing completion before the permit for their erection is applied for. Our City Commissioners and Building Inspectors are not fulfilling their duty when they allow the city by-laws to be thus evaded. We hope that the advent of the new year will witness an improvement in this particular.

WE had something to say last month regarding the apathy of the public in observing precautions for the safety of the public health. It would seem as though nothing short of a small-pox epidemic would induce anything like general compliance with sanitary laws. The Toronto Medical Health Officer, apparently realizing this fact, asks that authority be given the Health Department, in cases where owners or occupants neglect to keep their premises in proper sanitary condition, to have the work done, and tax the property for costs. The suggestion is worthy of adoption. There is a city by-law which provides that citizens shall clean the snow from their sidewalks before nine o'clock in the morning, or submit to be fined and have the work done by the corporation at their expense. How much more necessary is it that citizens should be compelled to remove causes of danger to their own health and that of the community at large!

IT would be difficult to estimate the benefits which have already and will yet accrue to mankind from the utilization of the electric light. As an aid to rapid construction, it will prove of great value. The advantages it offers in this direction are beginning to be made use of in this as in other countries. In the city of Montreal at present, building operations are carried on throughout the night as well as the day by means of the electric light. By its instrumentality also, the break in the Cornwall Canal, which stopped navigation at a most critical time, when vessels were carrying grain to market, was repaired in a much shorter time than would have been necessary if the work could not have been prosecuted night and day. Railroad construction has already been carried on by electric light, and the future will no doubt witness its employment in building operations in a much more extended degree.

WHILE the Toronto plumbing by-law is under consideration, with a view to its amendment, the system of plumbing inspection should be extended to cover old as well as new work. It is without doubt of the greatest importance that new plumbing should be subject to careful inspection; but it is not less important that the plumbing done prior to the existence of the plumbing by-law, should be regularly inspected also, and if found to be improperly done, or in any way defective and injurious to health, the owners should be compelled to make the necessary improvements. There is need for the employment of more inspectors, in order that the work covered by the by-law as it stands at present may be thoroughly done. While the work of the plumbing inspector necessarily occupies more time than that of the drain inspector, we understand the city employs four drain inspectors, but only two inspectors of plumbing.

WHAT a change may be wrought in a place in a very short time by a little industry and outlay! We were surprised at the improvement which has taken place at the Toronto Island during the past year or two. The work which is being done there shows that at last our city fathers have become aware of the great opportunities which the Island affords for park purposes. The city has been highly favored indeed in possessing such a valuable piece of land situated on the edge of a great lake, and but a mile across a bay from the principal thoroughfares of the city. A steady and judicious expenditure of money on the Island Park will, within a few years, work wonders with what is even now a rather barren spot. All the street sweepings or other matter of a like nature should be taken to the park, and used to make the place fertile and capable of growing a greater number of trees and shrubbery than at present. Every advantage should be taken of the lagoons to form small lakes, with water-ways connecting them with one another, the bay, and at one or two points, with the lake. What is proposed to be done should be thoroughly worked out, and the scheme carried forward to completion year by year, and thus it will not be burdensome on the tax-payers.

WE have been informed that although the Parliament Buildings were designed by one of the most renowned architects of the present era (in the opinion of the Hon. the Provincial Secretary of Ontario), it has been found necessary to re-design the centre pavilion. Whether this bas been done because of the unfavorable criticism to which the first design has been subjected, or because the architect thinks be may be able to improve upon it, we do not know. We believe that he can improve upon it; he certainly should be able, for the task is not by any means a difficult one. However, we do know that a change has been made in the design, and that a considerable one. It seems very strange that such material changes should be found necessary at such an early date, especially when it is remembered that all changes mean additional expense. It is not quite two years since the first design was placed on paper, and then it was not done in haste; and yet it has been found necessary to modify it. The Canadian design which was rejected by the great American genius, had been on paper some five years when he was called upon to give his unbiassed (?) opinion to bis own profit. Since he has found it necessary to alter his first design to meet with his own approval and those over him, after it had been on paper two years, would it not have been but fair and reasonable on the part of the same individual and individuals to have allowed the Canadian architects a like opportunity to have improved their design after it had been on paper five years? Not that it required improvement to surpass in artistic merit or in other respects the design according to which the present buildings are being erected. But Canadians are such broad-minded, honorable and unbiassed individuals, that they see good in foreigners when they can see no good in themselves. Of course, we are prepared to admit the superior intellectual and other qualities of our native politicians, and allow that Canadians have not the same ability to gain a like eminence in other walks of life. What we are not prepared to admit is, that they are inferior to them in like pursuits in other lands. Instead of worshipping the citizens of the United States and other lands, a little worship of ourselves, and a little patriotism for our country, might do both ourselves and our country good.

WE read the letter addressed to the Ministerial Association by the President and Secretary of the Anti Poverty Association, with considerable surprise These men apparently honestly think that they have grievances because a few men have been fortunate enough to make money without toil. They are not able to understand that what they would have us believe is the rule, is but the exception. The vast majority who possess land only receive from it a fair interest on the accumulated money of their industry, thrift and intelligence. No man is denied the privilege to acquire land by purchase. All that is necessary is, that he should have the

necessary qualities to make more money than he requires for his subsistence. Ignorance, indifference, laziness, thriftlessness and want of ordinary foresight, keep many poor, and always will do so. The time will never come when men will be made rich by legislative enactment, or any power outside of themselves. Personal effort and determination win success, not looking to others for assistance. The State has made, and is making, tremendous efforts to educate the masses, and if they do not receive the education which they profess to want so badly, they have no one to blame except themselves. If they would give less time to envying their more deserving and consequently more successful fellows, and give more attention to economic laws, they would be in a much better position to benefit themselves. At present they are ever prepared to cut their own throats by supporting wiley politicians, who flatter their vanities and call their ignorance wisdom, in preference to men who have their interest at heart, but will not stoop to gain their favor by upholding them in their shortsighted and fallacious vision. The poor suffer with the better off through bad legislation, obtained by all the contemptible and cowardly means known to certain classes of our politicians. The members of Anti-Poverty Societies, like others, will do all in their power to elect dishonest and corrupt men in preference to honest and noble men. Until the people understand the value and sacredness of a vote, very little can be expected of our legislators, except what will be for their own gain and that of their friends. The man who tells us of our faults is more our friend than he who encourages us in them. If the voter would but vote for principle and honorable conduct, and not for the man who pats him on the back, and thinks him a fool, or for a party or society, things in this world which are now all wrong would soon be righted. All men, though born free and equal before the law, are not equal one to the other. Some have more brains, or strength, or industry, or energy, or perseverence, or ambition, or other qualities than others; and these men will and must move ahead of their less gifted competitors. Each must strive for the best position he can obtain, and not fall to envying his better educated competitor.

SOME of the daily papers have been taking up the question of safe building. It has not been handled very thoroughly, but yet sufficient matter has been given the public for serious consideration. We have never been able to understand the apathy of the public to this question. Any man, no matter how ignorant, is allowed to construct on the very edge of our streets dangerous constructions, which may tumble at any moment and cause serious loss to life. That more accidents have not occurred, is due to the fact that we have not yet been able to entirely free ourselves from the bondage of good example set us by our fathers. But this time of bondage is nearly over. Ignorance is running a race with conceit to see which can approach most nearly to the point of collapse. If they were capable of judging when they had nearly approached the limit, it would be well, but that is not to be expected, and some day the innocent will be made aware of the fact that some one has blundered. That we have not had many accidents from buildings falling does not prove, as some people would have us believe, that our buildings are strongly constructed. There is a factor of safety which varies for different materials and under different circumstances, which has been adopted by all intelligent and competent constructors. This factor of safety is seldom less than three, and sometimes it runs as high as ten. Under the above rule of factors of safety, if a building or other construction fails under normal conditions, it must be held to have been only one-third as strong as it should have been. It is not that the constructor has built nearly as strong as he should have built, but that he did not build quite one-third as strong. In columns, the factor of safety is placed at ten when the column is thirty times its diameter in height. Therefore, a column 6 in. diameter and 15 feet high, should only be loaded with one ton, though its breaking weight is ten tons. That such a column may carry six, eight, or even nine tons, without breaking, does not prove that it should be loaded with more than one ton. Experience has shown the necessity of a high factor of safety to counterbalance any defects of casting in columns. There are many columns in this city of more than thirty diameters, carrying heavy fronts. That many have not broken under their loads, is something for which we should be thankful; but to go on being thankful, and not take any steps to prevent this trifling with human life, would deserve the most severe censure.

The most effectual method to stop this inferior construction, is to insist on those who have to do with such matters receiving a thorough training, and passing an examination which will show whether they are competent and deserving of public confidence. They should also be held fully accountable for all accidents which may result from their carelessness or ignorance. Let it be distinctly understood that loss of life will bring punishment on those who are the indirect cause, be it through carelessness or ignorance, and fewer will be found to undertake work beyond their abilities.

The proposal of the Minister of Education to establish a Chair of Architecture in the School of Practical Science comes at the right time, and we sincerely hope that it will at an early date become an accomplished fact. When the Government places the means of instruction within the reach of those requiring it, they should be forced to take advantage of the same by being denied the privilege of undertaking work for which they are not sufficiently trained. Want of knowledge of construction and sanitary engineering on the part of those who profess to have such knowledge, results most injuriously to the public. Accidents resulting in loss of life may occur through ignorance of the one, and sickness and death through want of proper and sufficient knowledge of the other. With an Architectural School to teach these and kindred branches, ignorance should not prevail. To give effect to the above, we would advocate that all who profess to have a knowledge of these branches and desire to practice them, should be trained in a somewhat similar manner to members of the medical profession. We do not know how this can best be accomplished, but we suppose that the first step should be made by incorporating an Architectural Association, with power to examine candidates who desire to practice as architects. We should be much pleased to receive the opinion of our readers on this most important question.

GAS MANAGERS' CONVENTION.

THE editor of the *Progressive Age*, New York, who attended the Convention of managers of American and Canadian Gas Companies held in this city last month, writes as follows: "The city of Toronto is one of the most sightly we know of, but, on the other hand, is one of the poorest lighted. Both electricity and gas are used, but of the former the lights are far apart on such few streets as they are employed, and very few are employed for indoor purposes. The gas service is so poor as to only make darkness more visible, and this in face of the fact that the works are on a very large scale. The daily consumption is about 1,500,000 feet, but the demand is in excess of that. * * * The fact that the inspection of gas and meters is under government control in Canada was incidentally brought out during one of the sessions of the convention in Toronto. The knowledge was apparently new to most of those present, but the general sentiment was that the idea was a good one. The country is divided into inspection districts, and an inspector, paid by the general government, is located in the principal town in each district. He is provided with an elaborate apparatus for making accurate tests of the gas, and visits every gas works in his district at such times as he sees fit to make an inspection, and his coming is not announced before hand. In fact, he may visit a town, sample the gas on the quiet and depart, all unknown to the gas company. The law exacts that meters must be taken out every five years and inspected, and, if found defective, new ones substituted. The act requires that the gas must not be less than .16 candle power, and imposes a fine for the existence of sulphuretted hydrogen.

MONTREAL GARBAGE CREMATORIES.

THESE crematories are worked under a patent owned by William Mann, of Montreal, and consist of two different plants. The one for garbage is situated in a thinly-settled part of the city and consists of a brick furnace, into which the garbage is received from an upper floor to grates within the furnace and the fire is allowed to pass over, evaporating the moisture which allows of the garbage itself igniting as soon as it becomes perfectly dry and the ashes resulting fall through the grate bars where they are removed to be used as filling. The chimney at the opposite end of the fire-box is about eighty feet high. No perceptible smell was present, and no complaint from the neighborhood had been received that the smoke caused any nuisance. The crematory for night soil consisted of two furnaces, upon a single chimney, and was in the main similar to the one for garbage, except that no grate bars were placed within the furnace, the night soil being allowed to rest upon a raised floor over which the fire passed in the same manner as already described. The fuel used is the cheapest kind of soft coal and coal screenings, and the amount needed about two tons per day.

NOTES OF A TRIP TO THE WEST.

By "ARACUS."

I HEARD the praises of Chicago sung by my acquaintances until I gradually became impressed with the belief that it was not only a great commercial centre but also a centre for all the arts. I was asked repeatedly if I had ever been in Chicago, and was obliged to confess that I had not, and that my travelling had almost all been done in the East and Southeast. I would then be informed that I had much to see and learn, and that a portion of what I should see was the buildings of Chicago. They were all that the mind could conceive—they were large, high, grand, and in fact, magnificently complete in all things. I would ask if they were artistic, if the façades were well designed? And without a blush my informant would answer "Yes!" That the buildings of Chicago should fulfil practical requirements, I was fully convinced. A commercial people invariably build what will suit their purposes, but nearly always without regard to the beautiful. But, so long as they give no attention to art in their building, there can be little of interest in their edifices to an art-loving stranger. My impression had been that there was little or no love for art in Chicago, and I must admit that I was not very much shaken in that opinion at the time I decided to make a visit to the great distributing centre of the West. However, I expected to see much that would be of interest, understanding that the West had made great strides towards a proper appreciation of Art during the past few years.

My companion and I arrived in the great city in the early morning some months ago, and after making provision for our physical wants, sallied forth to see the architecture of Chicago. We saw large buildings on all sides, but none to interest us until we came to the Court House and City Buildings. These derived their interest not from their artistic merit, but as an example of what the masses even now consider magnificent architecture, and of what the architects of a few years ago were able to accomplish. We wandered about all morning through portions of the business centre, and in the afternoon we explored the South Side, without seeing anything meritorious until we came to the pavilion in Jefferson Park. This building is well arranged for its purposes, and its outlines are very satisfactory and pleasing from all points of view. It has a large amount of artistic feeling in its composition, and should be a very instructive art object lesson to the many visitors of the park. While we did not see much to admire, we saw much which was immensely amusing. Some attempts in the way of construction were simply wonderful, but by no means examples to be followed. A designer should not give himself a feat in construction which, no matter how well it may be met, results in an absurdity, and a caricature of true constructive methods. Many of the attempts at construction in Chicago prove conclusively that there are many men, not altogether unknown, entrusted with work which they do not understand. There are few cities where so much clever and sound construction may be seen, but at the same time there have been many attempts at construction of a very unnecessary nature.

We were in the city two or three days before we were successful in discovering any work which was artistically satisfactory. Much of it is well planned and fairly well designed, but there is very little which is interesting outside of the fact that all requirements have been met, with the exception of the æsthetic. A very large number of the most admired buildings of Chicago are planned badly, and enclosed by the most worthless and inartistic façades that it is possible to imagine. It is not the ugliness of poverty, but an ugliness which results from lack of artistic feeling and superfluity of wealth. If less money had been expended, the ugliness would not have been nearly so vulgarly offensive. An article which I have read, on the business architecture of Chicago, characterized it as the best in the world, for it was so ugly and uninteresting that no one would look at it, and would thus be obliged to notice the goods displayed in the plate glass windows. This forcing of people to look at goods which very probably they do not want, may be business; and while we admire the push and enterprise thus shown in the race after wealth, we cannot help pitying a people whose only object in this world seems to be to live like the beasts of the field—only in the highest condition pertaining to beasts—not one thought of another existence, not one desire for refinement in this life, living without culture, without happiness, for all the world as if they were but atoms in the world's existence, and that all is over when their places are taken by the next generation. It is right to admire energy and push, but not where the higher objects of life are sacrificed to the lower.

This everlasting worry and work has provided a few with means more than sufficient to gratify their wants, but left them deficient in culture and refinement. Having money, they proceed to build for themselves houses in which to live and entertain their friends, and, being in a hurry, the house must be built in less time than is necessary to its thorough and studied designing and complete construction. The architect is hurried, but no limit is placed on the expenditure. The result is a most inartistic and unstudied building, constructed of costly materials. Very often there is something about the general composition attractive and imposing, but the detail is so crude and so lacking in refinement, that one turns away in disgust, and is inclined to execrate the proprietor for his unreasoning haste, and the designer for preparing the design without proper and sufficient study. Many of the designers of these costly houses could do better work than they have done, if they would but study their work properly. When fifty or one hundred thousand dollars will be required to give form to a design, one would think it was worth a little additional time to have the form artistic. If I were sufficiently wealthy to build one of Chicago's costly houses, I should much rather wait a year or two for my house, and have it one to be admired by the cultured and refined rather than by the masses, even though I should not be able to discern wherein the difference lay. Many times we were disappointed on seeing a building in the distance which composed well, but when examined closely, was lifeless and very often excessively vulgar. It would probably have some points which suggested a possibility of Art, but the detail would be bad—ostentation, vulgarity and crudeness being predominant.

There was but one house of all those on Michigan Avenue which satisfied our ideas of what a house should be. It is situated on the east side of the Avenue, and is built of brown stone. We cannot speak of the house in detail, not having taken any notes, but we know that we were impressed with the refinement, the repose and the completeness of the whole composition—showing plainly that the designer was an artist. That there is on Michigan Avenue only one house which calls for high praise, does not speak well for the residents of the street, nor for the architects of their houses. There has been more than sufficient money expended to have built good artistic homes, but it was thrown away in supplying costly materials, to be worked into crude and unstudied designs. Here and there we discovered a good piece of detail, showing what might have been done if a reasonable amount of study had been devoted to the whole work—or possibly it showed good cribbing powers. Strength, solidity, heaviness and barbarity, may impress the masses, but the cultured must have with the first two, refinement, dignity and repose. There are some houses on this Avenue which we should judge were the productions of disordered imaginations. They may please some in the present age, but we hope, few, and that as the years pass by, the number will be considerably lessened.

On the corner of Prairie Avenue and 17th Street, has been erected the most artistic house which we have yet had the pleasure of seeing. This house was designed by Richardson, and is all that the most fastidious could desire. It is dignified, quiet, unobtrusive, yet refined and homelike. While one looks at the house he feels that the occupants are cultivated and refined, and that he would like to know them. Unless the plan of this house was known to the beholder, he would be inclined to look upon it as retiring and gloomy in the extreme. The windows towards the street are few and small, which gives it somewhat the appearance of a fortress.

However, there is a large open sunlit court, into which all the principal rooms open, and, as there is no lack of glass surface, the house is exceedingly light, and cheerful, while at the same time it affords a refined and cosy retreat from the hurry and confusion of the neighboring streets.

There is another house by Richardson, situated on the Lake Shore Drive, which we admired, but did not consider nearly so satisfactory as the house on Prairie Avenue. There may be other artistic houses in Chicago which we did not see, but the number must be few indeed. We are not admirers of such mansions as Pullman's, and if their interiors are no more attractive than their exteriors, we do not envy their occupants.

The warehouse of Marshall, Field & Co., by Richardson, is a magnificent building, artistically expressing its purposes. It is simple to a degree, yet low, solid and artistic! There is not one feature about the whole building which does not speak of life and a purpose to fulfil. That one commercial building is artistically worth more to Chicago, than all its other buildings. It speaks of higher things than dollars and cents, and the sordid interest of a money hunting people.

We were all through the Rookery building, and were very much struck with its completeness and adaption to its purpose. It is well planned and thoroughly constructed. While the façades are striking and imposing, they cannot be said to be artistic. The ornament is rather indifferent, and much of it unmeaning. The building is, however, a credit to the architect, and to the enterprise of the city. The Board of Trade building is one of the most inartistic of Chicago, which is saying much, when one remembers the pile of meaningless ugliness called the Pullman Building. The Art Building is very satisfactory except in some of the detail, and in the carving, which is in our opinion, devoid of artistic quality and character. We did not see anywhere in Chicago, carving that would call for special mention. It was invariably lifeless, and consequently lacking in interest.

The church architecture of Chicago is extremely bad. We did not see a single building that was worthy of the least attention. Some of the churches have redeeming points, but there is so much that is bad even about the best of them, that one cannot speak even a single word in praise. The United States certainly holds the unenviable position of being almost entirely devoid of interesting ecclesiastical architecture. There are a few churches here and there, but not more than could be counted on the fingers of both hands, which are worthy of consideration. Taken as a whole, there cannot be found on the face of the earth a more uninteresting and meaningless lot of buildings than the churches of the United States. The writer remembers being in Baltimore some years ago, where they had a church which cost about quarter of a million dollars. Of course this building was pointed out as something wonderful and worthy of inspection. The cost of the building was also mentioned. We notice that the cost of everything is given in the States, as if the mere cost would give it intrinsic value. Much as we regret that so much money was expended in the erection of that building, we would like to see an equal amount, if required, spent in the removal of every trace of the first expenditure. One must regret that there is so much money forthcoming for the erection of such ungainly masses. There is no reason in the world why a church should not be an artistic building, suggesting and teaching "Peace on earth, good will to men." The form and every part of a church should speak to mortal man of God and immortality. Where is the man who can be impressed or led to give one single thought to eternity, when everything about him, even to the decoration, speaks in the coarse and vulgar tongue of his weekly surroundings? A man who enters a church decorated after the manner of a theatre or a saloon, will be more likely to have his thoughts go back to the last play he saw, or of the companions with whom he had very probably his last drink, than to a retrospection of his actions, and of the obedience and reverence which he owes his Maker. What may be excellent in one place may be extremely bad in another. Of one thing we may be certain, and that is, that nothing is too good for the house of God, and when we give, let us not only give our money, but also the best talent and ability of which we may be possessed. A church should speak through every stone in its walls of refinement and culture, meekness and courage, and obedience and reverence to the Almighty.

Chicago in a few years will have a magnificent system of parks and drives. The parks are yet too new to call for admiration, but when the trees have grown and other improvements have been made, no citizen of Chicago will need to be ashamed of the parks of his native city. We cannot speak favorably of the effects wrought by the fantastic arrangement of foliage plants which we saw at the entrance to South Park. The whole thing is ridiculously childish, and hardly worth mentioning. No good is obtained, except in the satisfying of vulgar curiosity, and causing thoughtless people to go away with an expression of wonder on their inane countenances. The same amount of money and time devoted to legitimate floriculture would give ten times the result, and would be one hundred times more refining to the the beholder. What can anyone admire in the representation of the two candidates for the presidency running around a conical mound. The figures are far from shapely, and totally devoid of beautiful lines. All that is left is the mass of color, which would be much more pleasing if it had not been made to give form to a meaningless conception. Nature cannot be improved upon, but it may be assisted to a full development. Nature is certainly out of place playing pranks at the dictation of men who are unable to appreciate its beauty in all its varying richness of colors and changing moods.

A visit to a place like Chicago, of which one hears so much, and of which there should be so little heard except of a commercial nature, satisfies one that in living in Toronto, he lives in no mean city. We have not so large a city by any means, nor is it the commercial centre that Chicago is, but we have much which Chicago has not, and that of very great value.

In architecture, we surpass Chicago. We may not—in fact we have not—the same money value in buildings, but we have what is of more value than that which can be rated in dollars and cents. Where in all Chicago, or for that matter in the United States, can one find a building so full of æsthetic interest as our University Buildings? Does not Osgoode Hall compare in refinement and dignity with any building on the continent? And is not St. James Cathedral equal to, if it does not surpass, any ecclesiastical building north of Mexico? Then we have several exceedingly good pieces of church work in St. Paul's Church, Bloor street, St. James Cemetery Chapel, St. Stephen's Church, Holy Trinity and Trinity Churches. There is also St. Michael's Cathedral, the exterior of which is good as the interior is lacking in merit, the tower and spire being especially fine. We must not forget the interior of Trinity College Chapel which is modern in execution, and of great beauty and excellence. Our modern churches, while not so correct in style, are full of merit. Instead of one or two examples of good church architecture, we have many, and yet there are among us those who will say bad work, if distant, and speak slightingly of good work, if at home. We have not all the good church work of the country in Toronto. There are churches throughout the Province which equal in merit the best buildings in Toronto.

Among our semi-public buildings may be mentioned the Molson's Bank, which is a refined and dignified piece of classical work, as is also the office of the Gas Company. The Trust and Loan Building, Masonic Hall, St. Lawrence Hall, Romain Buildings, and numbers of others of more or less merit. Of those buildings recently erected, we have the Montreal Bank, the Manning Arcade, and the London Loan Company building, all by Canadian architects. There are at the present time in course of erection three large buildings by an architect of Buffalo, one the Parliament Buildings, of which little can be said in praise, the Bank of Commerce, which is a very indifferent piece of work in composition and detail, and a building for the Canada Life Assurance Co., which is not yet far enough advanced to be judged. The only building so far erected by outside talent which is worthy of mention in the former list is the building of the Western Assurance Company which cost twice if not three times as much as any Canadian architect would have been allowed to devote to its erection. However, its designer has not been able to equal it in any of his later attempts, except that he has spent much more money with much less satisfactory results.

In house work, we have many good examples of plain, cosy houses of limited expense. We have not many which can be called expensive, and we regret that in one or two instances, the most costly houses are not equal in merit to the less expensive. We are not sufficiently wealthy to spend large amounts in the erection of private houses, but our architects have done very good work with the money at their disposal, and have shown conclusively that they are equal to the erection of costly residences when our merchants and others have acquired the necessary means. If there is one thing more than another of which Toronto may well be proud, it is the work done by her architects of the past and also of the present. May they be given the opportunity to which they are richly entitled to yet more worthily work in the interests of architecture in this city. Of late they have not received the encouragement they deserved, partly on account of the scandalous treatment the Ontario Government meted out to those who had sufficient confidence in its honor to devote their time and money to the preparation of plans for the proposed Parliament Buildings, in the hope that they would be entrusted with the carrying out of the work, and at the same time prove that Canadians were competent to meet worthily the architectural requirements of their native land. The example of the Provincial Government in entrusting the erection of these buildings to a citizen of the United States, has been followed by others who, not being capable of forming an opinion for themselves, followed the precedent set them, and are even inclined to claim that in employing an outside architect they are showing their superior knowledge of architecture, and freedom from local prejudices and influences. These men seem to forget that others may think just as lightly of their ability, because they are not in business in New York or Chicago, as they do of the capabilities of their fellow citizens who are unfortunate enough to practice architecture in a country which apparently does not desire to foster home talent, and yet who are not so lost to all sense of patriotism, as to leave the land of their birth for a foreign one, where, very possibly, their remuneration would be more commensurate with their abilities.

TORONTO ARCHITECTURAL DRAUGHTSMEN'S ASSOCIATION.

THE members of the above Association paid a visit to the Toronto Public Library on the evening of Tuesday, the 6th inst. Mr. Bain, the chief librarian, arranged the fine colored plates of St. Mark's Cathedral at Venice in such a manner that they could be readily examined, and otherwise exerted himself most successfully to make the evening one of pleasure and profit to the visitors.

AMERICAN INSTITUTE OF ARCHITECTS.

THE twenty-second annual convention of the above Institute, which took place at Buffalo last month, adopted the following resolutions:—

Resolved,—That this Convention deems the unification or federation of all the Architectural Associations of the United States of the utmost value and importance to the profession.

Resolved,—The American Institute of Architects recommends as proper and desirable, the employment of a Clerk of Works in the erection of all buildings of importance, as a means of obtaining the best results. He should be paid by the owner, but should be appointed by and under the direct control of the architect. The architect's supervision of and responsibility for the work should be in all cases insisted upon as vital to the vast interests of the owner, but such constant oversight as can be exercised by a competent clerk of works is an invaluable adjunct to the labors of the architect in securing uniformly good and honest work.

MONTREAL, Oct. 13th, 1888.

CHEAP HOUSES.

Blue prints, one quarter inch to foot, of "Witness" House Plans Competition prize city home, with two copies of the specifications for $2.50.

JOHN DOUGALL & SON.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—The above is from last night's *Witness*, and this is the scheme: John Dougall & Son advertised for competitive designs for a city house of minimum cost, and to get their money back, issued the enclosed advertisement offering one set ¼ inch drawings and two sets of specifications for $2.50. It seems rather strange that a paper like the *Witness* should stoop so low as to steal from those who in the past have given them every aid by furnishing them with perspectives, drawings, and descriptions of prominent buildings. It is still more strange that some of our prominent architects should lend a hand to a scheme so mean and petty. Such a scheme is only worthy of pettifogging publishers, and throws discredit on a house like that of J. Dougall & Son. This should be a warning to professional men in future against associating themselves with affairs of this kind.

Yours truly,

J. A. RADFORD.

TORONTO ARCHITECTURAL GUILD.

THE attendance at the last monthly meeting of the Architectural Guild of Toronto was very large; the number present being greater than at any other previous meeting. The meetings seem to develop strength as the members become better acquainted. There was a large amount of very important business transacted, and at times, the discussions were exceedingly animated.

The fire by-laws of this city were criticized, and it was unanimously decided that they could be materially improved. The Secretary was instructed to write His Worship the Mayor, and draw his attention to its defectiveness.

The proposed changes in the plumbing by-law also received much attention.

After a long, earnest discussion, a committee was appointed to consider the advisability of attempting to form an Architectural Association for the Province of Ontario.

THE PROPOSED SCHOOL OF ARCHITECTURE.

WE are much pleased with the information that the Minister of Education proposes to appoint a Professor of Architecture in the School of Practical Science. Such a step should be a very great benefit to Architecture in this country, and will be most heartily welcomed by all architects. Those architects who are at the head of the profession in this Province will look upon the school as a means to educate the people to a proper knowledge

of good work, by increasing the number of thoroughly trained men. The work of the best men must necessarily always be in advance of the art intelligence of the community, and then the task of educating the masses is thrown upon them. This work is at first disparagingly spoken of, and not until it is understood, does it meet with general approval. They must be satisfied with the admiration of their designs by the cultured and refined, which in itself would be sufficient, if they did not find it necessary to obtain the means of subsistence.

It is to be hoped that much careful study will be given to working out the details of the scheme, and that every means of making the school thoroughly effective will be adopted.

OUR ILLUSTRATIONS.

PARKDALE HIGH SCHOOL.

THIS building, which is now in course of erection, is red brick, with brown stone and terra-cotta trimmings, and covers an area of 11,500 square feet. It is heated and ventilated by the Smead, Dowd & Co.'s system. Has seven class and four cloak rooms, science, head and assistant masters' and lady teachers' rooms, with store rooms, a library, the ceiling of which is panelled in plaster, and a large assembly hall on the top flat, with stage, dressing and cloak-rooms. In the basement are boys' and girls' waiting rooms, offices, &c. In close proximity to the school building, gymnasiums for boys and girls will be erected. Total cost of school building, $28,000. Geo. E. Miller, Toronto, architect.

COLLEGE STREET BAPTIST CHURCH.

Dimensions of church, 70 x 77 feet; of school building, 48 x 81 ft. Material, red brick, with dressings of Lake Superior brown stone. Front faced with Credit Valley brown stone to impost of entrances; jambs of entrances and quoins, of Lake Superior stone; arches and labels of entrances, of terra-cotta; spires roofed with red tiles, finials of terra-cotta. The Smead system of heating and ventilation has been adopted. Total cost, about $35,000. Messrs. Langley & Burke, Toronto, architects.

HALL INTERIOR—HOUSE OF FRANK SHEPARD, ESQ., CHICAGO.—KNOX & ELLIOTT, ARCHITECTS.

NEW COMPOUND FOR HARDENING WALLS.

A PATENT has been granted for a waterproof compound adapted to be applied to the floors and walls of buildings to prevent the access of water and dampness, and which will also withstand extreme and varying temperatures of air, and which will be practically indestructible. The composition consists of the following ingredients, combined in substantially the proportions stated, viz: New Zealand (or Portland) cement, 100 pounds; cream of tartar, 3 ounces, pulverized ivory, 2 ounce; quicksilver, 1 ounce; isinglass, 4 ounces; marble dust, 5 pounds; sand, 200 pounds; rain water, 1 pail. In compounding the ingredients, a small quantity of cement, for instance, one pound, is mixed with the cream of tartar, quicksilver and isioglass, and water enough to make a very thin paste, and the composition is let stand about twenty-four hours. If the weather be cold the composition should stand in a warm place. The remainder of the cement, the pulverized ivory, marble dust and sand are mixed dry, and the standing composition is thereupon added, together with enough rain water, about half a pail, to produce a plastic mass capable of being readily laid with a trowel or similar implement. After the compound is laid upon a suitable foundation, such as wood, earth, brick or metal, it becomes very hard, equal to steel, and capable of a very high polish.

Building operations in Winnipeg during the present year are expected to aggregate a quarter of a million dollars.

The McClary Manufacturing Co., of London, Ont., will erect a new four-storey building which will contain recreation and reading rooms for their employees.

The *British Architect* quotes from the *Estate Clerk-of-Works* a discussion on the relative advantages of different sorts of roof-covering for farm-buildings. Most of the participants in the discussion approve of good tiles, as being handsome and durable, and giving, when well laid, a very perfect roof. One person, however, prefers slate to tile, for the reason that tiles retain moisture, and rot the woodwork under them, while the timber, under slate roofs are almost always found dry and perfect. Another speaks of oak shingles as forming a good roof material, which when well nailed with zinc or copper nails will last for centuries; while a third recommends roofs thatched with reeds, which remain good for fifty years or more, and form a covering which is warm in winter and cool in summer, and is thus well adapted for stables and cattle-sheds. Another roof which is mentioned is we imagine, new in this country, and consists simply of tarred felt, whitewashed out side. The whitewash is made with lime and skim-milk, and is renewed every spring. During the summer it reflects the sunlight, keeping the rooms under it cool, and in winter it helps to preserve the felt from the weather, besides, no doubt, checking in some degree the radiation of the interior warmth. So far as we know, shingle roofs are the only sort which are ever whitewashed here. These are occasionally treated with lime-wash and alum to preserve them, but the effect of the whitewash in repelling the heat of the sun is little thought of, although in our hot summers the practice of painting roofs white, as is done in China, and in Southern France, would certainly be advantageous —*American Architect*.

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

CONSTRUCTION IN MANITOBA.

BY ARTHUR T. TIMEWELL.

IN a country where a comfortable habitation for both man and beast is so essential to the comfort, success, and happiness of the farmer, and profitable renumeration to the owners of the latter, a few remarks upon the above subject you could perhaps find space for in your valuable journal.

Foundations of buildings must always be a very important factor, and I have found that owing perhaps to the extreme dryness or the severity of the frost in this country, that it is not so necessary to excavate below frost line (as it is called) as in other countries where the frost is not so intense, except for projections, such as porticos, veraodahs, steps, &c., and very light buildings. The posts do not heave under the main buildings. A thorough good foundation may be obtained by placing tamarac or cedar plank sufficiently wide and thick to form a base, on the virgin prairie, care being taken not to disturb the original turf. The roots of the grass, weeds, &c., are so tough and interlaced with each other, that they will support a very heavy framed structure. The foundation planking and sills above should receive a coat of creosote tar, or even limewhite, before being laid, and covered with earth. While advocating the above class of foundation, I do not wish to be understood to say that it is the best, but I have proved it to be good, and in a new country where expense is necessarily considered, it certainly meets the economical requirements of the people, more especially as in order to secure a more substantial foundation of concrete stone, &c., it is necessary to excavate so very deep to get through the top soil of rich black loam, that unless a solid bottom of shale, gravel, &c., is arrived at, it is not well to place hard substances with irregular surfaces, such as stones, upon a yielding substance, except in the case of the best Portland cement concrete, carefully and properly prepared and filled in the trenches to a depth of say three feet. Even this is generally ruled out because of the expense, although owing to the great adhesive properties of this material, and its well known resistance to a great transverse and tensile strain, if expense is not an object, this is no doubt the best foundation. Even concrete, however, should be laid on a hard bottom. While on the subject of concrete, I will say at once that I consider this material from every point of view the very best for construction of all classes of farm buildings, owing to its being fire proof, everlasting, impervious to vermin, and in most parts of the country, the cheapest material that can be used. The walls, floors, and even roof can all be built of concrete, composed in the following manner:—Three parts of stone or gravel broken into small irregular pieces about two inches in diameter, and two parts of sharp clean sand or ashes, to one part of fresh well-burnt lime, powdered or ground to a powder. The component parts should be carefully measured and mixed dry, and then well wetted and dumped into position. In the event of good Portland cement being used instead of lime, nearly double the proportion of broken stone would be a proper quantity. In all cases hollow walls, or outer and inner walls with an air space between, should be built. Wood sides three feet high, made of boards fixed together with ledges, should be placed on edge the required thickness of the wall apart, and a core or box, 4 inches thick, should be placed in the centre to form an air space. A round block of wood should be placed in the position required for chimneys, shafts, &c., and the door and window frames fixed where required. The wet mass of concrete is then to be dumped into the mould formed by the boards, and large stones can be pressed into the soft concrete in the centre of walls. This is to be continued round the building sufficient time being given to allow the concrete to set. The same boards, cores, &c., can then be removed, and fixed on the top of the wall, the same process being repeated until the full height of the storey is attained, inserting wood, bricks, lintels, plates, &c., as required. The outside of the wall, if lime concrete is used, should be rendered in Portland cement, to protect it from the weather. This work can all be done by unskilled labor. Should floors and roof of concrete be desired, it must be made with cement, with old railway iron or light flanged girders inserted every three feet in width. The properties of concrete and the method for using the same, is so well known to nearly all your readers that perhaps there was not any necessity to go into so much detail.

QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE prospect of widening St. John street (within the walls) are improving. The city council has been empowered by the Local Legislature to issue bonds to the extent of $100,000 for the purpose. A good start may be made with this sum, but a further amount will undoubtedly be required. It is to be regretted that the proprietors, generally speaking, demand the high figures they do, especially in view of the fact that the value of real estate in this street has fallen so low that in many instances not more than 30 or 40 per cent. of the former rents can be obtained—this being largely due to the miserable narrowness of the street. Naturally the business has left for the wider and more open streets, where people may move about with some comfort. The lot occupied formerly by the Proran building, and acquired some time ago by the corporation, and subsequently sold to Dr. Casgrain, has been utilized by that gentleman, who has erected on the new line a dwelling and dental office on one half of the lot, purposing next season to build upon the remainder. The new building has two stories and mansard roof, built of white brick, with cut stone trimmings, neat but inexpensive; the cost has been about $600. The contractors were Messrs. Dixon & Bazie, the architect, Mr E. Charest.

St. John street (without the walls) has been embellished this season by the completion of Hetherington's Block, built on the same design as the portion erected last year, and pressed brick front and cutstone trimmings. Over the gateway leading to the factory yard, an oriel window has been erected, running up through two stories. The windows have leaded lights with bands of glazed tiles between the same; the whole terminates with cast iron crestiog The shop and offices occupy the front floor. The floors are laid with tiles, counters made by D. S. Rickaly, of cherry, with walnut mouldings, birdseye maple panels and red marble top. The new building completes the arrangements which the Messrs. Hetherington have been wanting for some years to enable them to carry on a very extensive plain and fancy biscuit manufacturing trade. The cost of the new building approximates $7,000. The structure was erected by Alex. Cummings, under the supervision of H. Staveley, architect.

A rather unfrequent erection in Canada, the hanging of a chime of bells, is now going on in the tower of St. Matthew's Church. They number eight, and weigh altogether close on 600 lbs. They are from the Warners, and are fitted with a chiming apparatus, although it is intended to have them rung by a guild of young men. The total cost of the bells including setting in place will be about $2,600. The Anglican Cathedral chimes hung so odd years ago, weighed nearly 800 lbs.; few cities in Canada can boast of two chimes, as can the "Ancient Capital."

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

The "Ambitious City" is decidedly on the march of improvement in the building line, as is evidenced by the decidedly growing taste for good design and modern sanitary improvements. Some of the villa residences now being erected in the suburbs reflect much credit on the designers. The fronts are generally done in red stock brick, and tuckpointed. The arches and strings being done in red, white and black brick, which will give an effective appearance. In the better class of residences, cut stone is used in the dressing with good effect; and, in this connection, to what perfection can the craft of bricklaying be brought for exterior decoration. Formerly brickwork was perfectly devoid of design—nothing more than filling in between cut stone dressing. Now, with the improvements in the mold in which the bricks can be formed in any shape, bevelled or moulded, and the improved chemical process of coloring the brick in different tints, the architect has a fair field for showing good design at moderate cost. It can be seen in some of the tastefully finished brick fronts in the cities of the United States, and to a great extent in Toronto and elsewhere. More than the ordinary bricklayer's skill will be required in such fronts. None but first-class workmen can be employed, for no matter how good the design may be, and the material of the best quality, still, if the work is not done in a first-class manner, the desired effect is lost. In fact, the time is coming when the bricklayer's trade will be more than a mere labor occupation. This advantage can be attained with the favorable opportunities now afforded to young mechanics to improve their time by studying in the Schools of Art and Design, and also in reading the periodicals bearing on Architecture.

It is generally conceded now that the bad results of the late strikes are fading away from the minds of the people. It is to be hoped that a repetition of the folly will not occur in the ensuing spring. If not there can be no doubt of a good season of business in the building trades. Experience has taught the Union a severe lesson, and we may reasonably hope that in future they will conduct matters with care and discretion.

I regret to say that our city fathers have so far made no perceptible effort to compel the record of new buildings. Only one half of the buildings commenced here have been entered in the Inspector's book. Some excuse may be made, however, as I understand the inspector, Mr. Morrison, has been for some weeks confined to his home with sickness, but it is to be hoped that when he is again able to attend to his duties, he will straighten out matters effectually.

OTTAWA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

Since my last report building operations have been very brisk, the greatest drawback being want of sufficient hands to carry out the work under contract. As in former years contractors take hold of all the jobs they can get early in the season, without calculating how they are going to get through with them at the close of the season, with the limited number of hands here; whereas some contractors have not anything to do. This state of affairs necessitates a great deal of trouble to the architect, and loss to the proprietor.

A committee, consisting of the two city Engineers and the Chief of the Fire Department, along with architects Hodgson, Bowes, and Alexander, were appointed by the city council to draft a by-law for the guidance of a building inspector to be appointed. The committee have completed their labors. The draft of the by-law will be submitted to a special meeting of the city council next week, and if adopted, an inspector will at once be appointed. Already about fifty applications have been sent in. It is to be hoped a competent man will receive the appointment, otherwise the by-law will be a dead letter.

The competitive plans for the new police station have been finally disposed of, the plans of J. R. Bowes having been adopted. The building is now under way, and will cost about $15,000.

A great deal of dissatisfaction exists amongst the architects here, regarding the manner of letting out contracts, the custom being to let out the different trades to separate contractors, in consequence of which the architect is compelled to look after six contractors on each job, whereas if the work was let to one man, it would be less trouble to the architect, and more satisfactory to the proprietor, because under the present method the contractor puts the responsibility of all delays on the shoulder of the next contractor. An effort will be made next season to adopt the bulk tender system.

I regret that a stronger effort is not being made by the archi t

of Ontario to form an architects association. I trust the architects of the Western cities will express their views through your columns, and that an effort will be made the coming winter to form an association. I would suggest that the architects of Toronto make the first move in the matter, and call a meeting for that purpose. The architects here are very much in favor of it.

I was much pleased with the illustration in your last issue of the Toronto City Hall and Court House. Such illustrations cannot but make your paper very interesting.

I am sure the architects throughout the Dominion will learn with pleasure that chief government architect Fuller, who was stricken with typhoid fever some weeks ago, and whose life was despaired of, is in a fair way to recovery, and will be again attending to his duties by the new year.

It is impossible yet to say what the building outlook for next year will be, but it is thought it will not reach this year.

The contract has just been let for a new Roman Catholic church to cost $6,000. An architect from the Province of Quebec prepared the plans.

The contract for a skating and curling rink has just been awarded, the price being $12,000.

ments at that time. After they had been prepared, however, the Council made no use of them, and until the present year, nothing further appears to have been done in the matter. At the present time, the Council has under consideration the draft of a proposed plumbing by-law, and those who are interested in seeing the sanitary condition of the city improved, hope that soon a law will be placed on the municipal statute book that shall decide the competency of persons who desire to do plumbing work, the method of doing it, and the character of the materials to be used.

The contracts for the new addition to the Windsor Hotel have been awarded as follows: Stonework, St. Louis Bros.; carpenter work, Wm. Begard; iron work, Dominion Bridge Co.; painting and glazing Cassels & Son; plastering, Wm. Cook; roofing, G. W. Reed; plumbing, Garth & Co. The building, which is to be constructed of lime stone with Ohio sand stone dressings, will have a frontage of 80 ft. 6 inches on Peel street, by 248 feet on Cyorus street. Messrs. J. W. & E. C. Hopkins, of this city, are the architects.

Construction has been suspended on the new Protestant Insane Asylum, owing to an injunction, granted to Mr. John Crawford, who claims that the institution would depreciate the value of property in the locality.

Hall Interior Knox & Elliot. Architects. Toronto.
House of Frank Shepard Esq. Chicago.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

IT is little wonder that Montreal is the scene of so much infectious disease, when the character of the plumbing done in a majority of the houses is considered. When I state that the number of competent plumbers in this city might almost be counted on one's fingers, and that there is no city ordinance for the regulation of plumbing, your readers will perhaps be able to picture to themselves what the sanitary condition of the city is like. The situation is briefly this: Any man who calls himself a plumber is allowed to do plumbing work, and may use such materials as he pleases. The result is, that a large proportion of the so-called plumbers are graduates of the tin shops, and what little knowledge of plumbing they may have, has been "picked up." They put earthen pipe under the floors of the houses, and do a hundred other things that would not be tolerated for a single day in a city where regard is had for human life. The Plumbers' Association, which is composed of *bona fide* plumbers, appears to be fully alive to the sanitary requirements of the city, and is doing what it can to bring about a better state of things. Your correspondent was shown documents prepared ten years ago, containing provisions which it was thought the City Council should embody in a by-law for the regulation of plumbers. These documents were prepared by leading plumbers at the request of the City Council. Many days were spent in considering their adaptability for the purpose, and there is every reason to believe that they would have been suited to the city's require-

The new St. James St. Methodist Church building is expected to be completed by Christmas. The wings and basement are already in use.

A handsome classic front is being erected for the Imperial Life Insurance building on St. James Street.

The Royal Insurance Co. are expending sixty or seventy thousand dollars in improvements to their building. Four new stories of stone are being added, and fitted with elevators, etc., for use as suites of offices. The District Savings Bank building is being similarly treated, under the supervision of Mr. Raza, architect.

I regret to hear it stated that the directors of the Young Men's Christian Association have decided to give the work of designing and erecting their new building into the hands of an American architect. I trust that the example of the Ontario Government and some of the business institutions of Toronto in handing over important buildings to outside architects, will not be followed here. There are standing in this city many buildings which proclaim the ability of some of our local architects. Further than this, the money for the erection of this proposed new Y. M. C. A. building, was subscribed by the citizens of Montreal, local architects contributing their proportion. This being the case, it appears to me that the citizens have a right to expect that the money thus subscribed should find its way into the pockets of Montreal architects, contractors and supply men.

One method of securing for themselves fair treatment, is for the architects of this city, like those of Toronto, to form themselves into an association, which should embrace only men who are known to have a proper knowledge of their profession obtained in the proper way. By this means those who with scarcely any knowledge of architecture have set themselves up to be architects, and are debasing the appearance of our streets with masses of ugliness, would occupy their true position outside the ranks of a profession which, under present circumstances, they bring into disrepute.

It has been decided to substitute copper for Muntz metal for roofing the new city hall at Hamilton, Ont.

Messrs. Tambling & Jones, of London, have been awarded the contract for the new post office at Goderich, the figure being $13,000.

The contract for the new $17,000 post office at Brampton Ont., has been awarded to Mr. J. Perry, and Messrs. Mason & McCulloch, of that place.

Mr J. W. Hughes, of Montreal, writes as follows to the editor of the *Engineering and Building Record*:—"A friend of mine having trouble with a hot-air furnace, that was right according to all rules of trade and practice, and fully large enough for its work, tried the experiment of raising the inlet-pipe for the cold air some two feet up from the bottom of the ash-pit, where the usual inlet is. The result was a magical one; everything changed from almost a perfect failure to a perfect success. The same experiment was tried a second time on another furnace with similar results, and naturally the conclusion was come to that the cold air should not enter quite at the bottom. I have a theory that to me seems quite satisfactory, for accounting for the advantage claimed in changing the position of cold air inlet, but would like some of your correspondents to write something on the question. It may of course be common practice somewhere to bring the cold air in high up. In Canada the lower the better is the rule."

The new C. P. R. passenger depot at Montreal will cost about $2,000,000 and will be completed for trains to enter about 1st December. It will probably be the finest passenger station in America.

Messrs. Eby Bros. have purchased the foundry of Mr. C. E. Moyer, at Berlin, Ont., and have commenced the manufacture of the Boynton wood furnace, an illustration of which appears in their advertisement in this journal.

The Montreal Bridge Co., have received a contract from the Public Works Department, Ottawa, to construct a stationary bridge to replace the present suspension over the Chaudiere Falls. The bridge will be of but one span, 236 feet in length, 45 feet wide and guaranteed to withstand a weight of over 200 tons. The price of the contract will reach $30,000.

COLORINGS.

IT might reasonably be supposed that colors used in outside painting would be selected with due regard to their durability, but the faded colors so frequently seen proves very conclusively that some painters either do not know what to use.

Among the durable colors may be named the following: In black, lampblack and vegetable black; in yellow, yellow ochre and Naples yellow; chrome yellow turns dark in bad air; in reds, Venetian red, Indian red, madder lake; carmine lake, vermilion and chrome red are not good for outside work; in blue, ultramarine is the only permanent one. Among the most durable and reliable colors may be found the ochres, raw and burnt umbers and siennas, the reds named above, Vandyke brown and their mixtures. Raw umber is very durable either in water or oil, and mixes with other pigments without injury. Yellow ochre can be mixed with lime without injury, and is thus well adapted to distemper painting.

Among the non-durable colors are all manufactured chemical colors; chrome yellow, chrome green, prussian blue, cobalt, Antwerp blue, indigo will all fade, either singly or in combination. Zinc white, though of less body than white lead, is more delicate and durable and should be used at the seaside especially, as sea air is particularly injurious to lead.

Greens direct from copper, arsenic, etc., are much more durable than mixed ones, although, of course, all productions of arsenic are more or less injurious to health.

Rinse your hair pencils out thoroughly in turpentine and work the brush about in dry dust.

Varnish, japan and all sorts of liquid dryers are based on oil, and while they compel a coat of paint, to dry quickly, they do not neglect to supply some building strength.

If it is the intention to calcimine on one-coat work, a very good finish may be made by using some hard finish on the hawk and hand float the surface with water in the brush.

Less cattle hair is required in the plaster on brick walls than on laths, and usually stone and brick walls have but one strong wall coat, and on this it is finished with lime and plaster-of-paris.

When the ceiling is simply tinted the first should be one that softens into the wall paper or wall color, not one that contrasts. Thus if the tone of the room is a soft grey blue, the ceiling should be of a clear fresh pink; or should a grey-green be picked out with black, a lemon color will be appropriate for the ceiling.

A solution of chloride of copper will show the difference between gilding for which gold has been used, and gilding with alloys of inferior metals. If the gilding be imitation gold, a touch of the solution will give a black mark, copper separating out through the zinc in the yellow metal; with pure metal no discoloration will occur. Common gold goods, of fourteen carat gold, will not change their color with nitrate of silver. Leaf gold is tested by being shaken up in a closed bottle with sulphur chloride.

PERSONAL.

Mr. William McLea Walbank, C. E., of Montreal, was married on Oct. 10th to Miss Isabel Richards, of Bideford, P. E. I. The happy couple have just returned from a tour of the Southern States.

Mr. James Adams, architect of the penitentiary, Kingston, Ont., recently had an encounter with a burglar, who knocked him down with a club, and escaped, followed by a shot from Mr. Adams' revolver.

The many friends of Mr. Fuller, chief architect of the Department of Public Works, Ottawa, will regret to learn that he has for some time been prostrated by an attack of typhoid fever. At one time grave apprehensions were entertained that he could not recover, but we are pleased to know that a change for the better has set in, and he is now on the road to recovery.

Messrs. R. McDougall & Co., Galt, Ont., manufacturers of the Plaxton Hot Water boiler, were recently burned out. They announce their intention of rebuilding on an enlarged scale. Meanwhile they have resumed manufacturing, and are filling orders as usual.

It is noticed that Oregon cedar shingles are beginning to be handled in New York. As this is the case, why would it not be just as feasible to open up a trade in Eastern Canada for British Columbia shingles? They are readily sold now all over Manitoba and the Territories, and a profitable market should be found for them further east.

HEATING BUILDINGS BY HOT WATER CIRCULATION.

By John. P. Armstrong.

MUCH has been written on the merits of the different methods of heating buildings, and it is admitted by all disinterested, intelligent persons, who have given the matter any consideration, that hot water circulation is far in advance in every way of either stoves, furnaces, or steam.

There are, however, a few apparently intelligent people who still hold on with tenacious grip to the almost exploded idea, that steam is the best, and these advocates are found amongst three classes. First, those who have a financial interest in sustaining that theory; second, those who imagine that the earth will surely crumble away if anything out of the old order of things is adopted; and third, those who, from a want of knowledge, honestly believe that steam heating is the best. The first two I will not try to disturb, but let them sleep on. They will awake up some day, and wonder what is the matter when someone laughs at them for dating a letter 1600 A. D. But to the third class of persons, I would like to present a few reasons why hot water circulation is far in advance of steam.

Steam heating is bad physically, because its effect upon the radiators or coils through which it passes is, that they are heated to such a high temperature that the atmosphere upon which they act is robbed of at least one-half the humidity considered desirable from a health standpoint. This has reference not alone to animal life, but to vegetable life also, as I have seen frequently proved in greenhouse work. Some persons imagine that this injurious effect is overcome by keeping one or two open wells in the house. This is a mistake, because it is only the plants immediately surrounding these wells that will be benefitted thereby, while those at a distance will suffer almost as much as though there were no open wells in the house.

Steam heating is dangerous, because no matter what automatic appliances may be employed there is danger of explosions, and the temperature of the pipes is so high that there is a very great possibility of fire, either from contact with wood, the accumulation of dust on them, and the facility which rats find for making warm comfortable nests in the coils, in which have frequently been found bits of waste, and other inflammable matter.

Steam heating requires skilful attendance. The possibilities of accidents are so numerous, that it requires a man with a thorough knowledge of the apparatus to be in constant attendance upon it, and even then, it is impossible to guard against the many little accidents which often lead to sad, disastrous consequences. In the report of the fire marshal of the city of Boston for the year ending May, 1888, there were five fires which were known to have originated from the contact of wood, dust, waste or some other such substance with the steam pipes, and many other fires the origin of which were not and never will be known, but some of which, if the inanimate could speak, could without doubt be traced to the system of steam heating. In this respect Boston is not the exception, but rather the rule, as shown by the reports of other cities.

Lastly, though by no means least, steam heating is not economical. From the moment the fire is lighted until steam is generated, which is at least one hour, there is not the slightest change of temperature throughout the house; and once it is generated, the water must always be kept up to 212°, because if it drops below that, it ceases to give off steam, and that already in the pipes condenses and they become cold, although the water may be at 200°, which would be high for hot water circulation. So that to get any heat in coils or radiators heated by steam, necessitates a constant consumption of fire sufficient to keep the water at not less than 212°; and this irrespective of the weather. It requires just as much fuel to keep the water boiling when the thermometer is at 40°, as when it is 10° below zero (at least the fractional difference is so slight, it is hardly noticeable). The fact of the entire absence of heat through the building, when the water drops below 212° is especially fatal to plants in a greenhouse during the night, because the heat given off by the condensation of the steam remaining after the water has dropped below 212°, is so quickly absorbed by the large body of glass surrounding it, that the temperature in the house soon falls fatally low for any delicate plants which may be in it.

Now in all the foregoing points, hot water circulation is directly opposite to steam. Physically, it is the most perfect system of heating known. It gives a mild steady heat, and its effect upon the humidity of the atmosphere is so slight as to be imperceptible. On this account it is invaluable for heating greenhouses, in addition to the more important item of adding to the health of dwellings. With hot water, there is not the slightest danger of explosion, because the system is open to the atmosphere through the expansion tank, and the only pressure that can be on the boiler or pipes is the weight of the water in the system, and this, in a three story dwelling, would not be more than from 15 to 18 pounds to the square inch, or about atmospheric pressure, which is less dangerous than the ordinary cold water pressure in some city mains.

The freedom of hot water heating from the possibility of causing fire, is amongst the strongest facts which recommend it as the ideal method. I have never known, nor has any report ever reached me, of a case where the contact of any substance (with the exception of phosphorus matches or some such matter) with hot water pipes, was the cause of fire, because no part of the outside surface of the system is ever heated to a higher degree than about 190°, so that these surfaces might be exposed against wood, paper, &c., with perfect safety.

The simplicity of the apparatus required for this method of heating is such that a boy, girl, or any person able to lift a shovel-full of coal can, give it all the attention required, all that is necessary being to see that the fire is kept going and that the water is kept up to the required level in the expansion tank, which only needs attention about once in two weeks, and sometimes even a longer interval.

A slight consideration of the principles which govern hot water circulation will plainly show that it is by far the most economical method of heating. As before noticed, steam is not generated until water has reached 212°, and until this temperature is attained, there is no benefit to the house. With hot water, the moment the fire is lit circulation begins, even the burning of a newspaper in the fire-box being sufficient to start circulation, and that means an immediate rise in the temperature of the surfaces of the pipes, which in their turn affect the surrounding atmosphere, and will go on steadily increasing as long as the fire is kept up, until it reaches the maximum point, about 190°. Should the fire be allowed to burn out through forgetfulness or carelessness, the water in the coils or radiators will continue to give out heat for about four hours afterwards. This is a characteristic of the greatest value for greenhouses. Another very important feature is the fact that the consumption of fuel is regulated by the weather. To keep up steam it is necessary to burn as much fuel in moderately cold weather, as when the cold is extreme; but in hot water heating the fire is regulated according to the temperature of the atmosphere. This difference in working, causes a saving of an average of 30 per cent. in fuel. This, of course, depends, to a very great extent, upon the construction and capacity of the boiler.

A retired plumber thus gives a point for the gratuitous relief of householders: Just before retiring at night pour into the clogged pipe enough liquid soda lye to fill the 'trap' or bent part of the pipe. Be sure that no water runs in it until the next morning. During the night the lye will convert all the offal into soft soap, and the first current of water in the morning will wash it away and clear the pipe clean as new.

The Orillia *Packet* comments as follows upon the article which appeared in the CANADIAN ARCHITECT AND BUILDER recently, concerning the surprisingly small amount of space given by the daily press to the important subject of the preservation of the public health: "The *Packet's* experience in this regard is not encouraging to the press. Its persistence for years past in pressing for sanitary reforms has undoubtedly been productive of some good, but the advance made is so slow as to be almost disheartening. Even members of the Board of Health, and the officials under them, are content to do almost anything, or rather to neglect everything, for a quiet life, so little do many realize the importance of cleanliness and wholesome sanitary surroundings; and the paper which keeps dinning away at the subject is voted a 'crank' and a 'bore.'" Our contemporary should not get discouraged. A great advance has taken place in the direction of sanitary reform within the last decade, and if the subject is given its proper position in our public schools, the next generation will not be so apathetic as the present one. As to the advocates of this reform being called cranks and bores, that is a matter of little consequence, in view of the fact that some of the greatest and wisest reformers of history were similarly regarded.

CANADIAN VS. IMPORTED SEWER PIPE.

"THE editor of the CANADIAN ARCHITECT AND BUILDER is in receipt of the following letter from a gentleman in the United States, whose name we withhold for the present, having no authority to make it public:

'I am thinking of establishing a manufactory for sewer tile, etc., in Canada, if I can find a clay suitable for the purpose, and I think I know where I can get it.

I write to you for information regarding the market for sewer tile, and to find out if the demand is at all good; also if there is any manufactured in Canada at present, and to what extent. I, of course, refer to a vitrified, salt glazed tile, and I understand the largest size at present manufactured in the country is six inch.

Any information you can send me on the subject will be thankfully received.'

Upon receipt of the above letter, we instituted enquiries, with a view to obtaining the information sought for. We were informed by the principal dealers in sewer pipe in this city that a wide field lies open to the manufacturer of a first-class article in that line in Canada. There are at present two manufactories in Canada—one in Ontario, the other in Quebec. These, we are informed, supply but a very small percentage of the sewer pipe used in this country. The largest proportion is imported either from Scotland or the United States. We enquired whether it was owing to the limited capacity of the Canadian manufacturers to produce these goods that such a large proportion had to be imported. The answer was that it was due rather to the inferiority of the pipe at present manufactured in Canada as compared with the imported article. The city of Toronto, it was said, would not allow the use of the native article, and that one dealer alone imported into Toronto last year 200 car loads of drain and sewer pipe. We give these statements to the public as they were given to us, with no desire to injure in any way any industry at present operating in Canada, but rather to point out to the proprietors of such the apparent necessity of improving the quality of their output, if they desire to supplant the manufactures of other countries at present used so largely in our public works. We also consider it a duty to encourage the establishment in Canada of manufactures whenever there appears to be a profitable opening for the same."

The article quoted above was published in the CANADIAN ARCHITECT AND BUILDER for October. The statements contained in it are disputed by the managers of both Canadian sewer pipe manufactories. The following letter has been received in regard to the matter from the Hamilton and Toronto Sewer Pipe Company:—

HAMILTON, Oct. 27th, 1888.

Publisher CANADIAN ARCHITECT AND BUILDER, Toronto.

DEAR SIR,—We notice in your October issue, page 10, an article on the manufacture of sewer pipe which is incorrect, misleading, and calculated to injure the industry in Canada. We think you should have made enquiries from the manufacturers, as well as dealers before making such a statement. Although not solicited, we hope you will excuse us for offering you some statements respecting the make of pipe in Canada. The factory in Hamilton, established in 1860, and which was very weak in the beginning, has become a large business, making all sizes of pipes from 4-in. to 18 in., including junctions, elbows and traps. Our trade has increased to double what it was three years ago. We supply nearly all the pipe used in Ontario except in Toronto, where a prejudice has arisen against the use of Canadian pipe through the use of a slip glazed pipe which was made in Yorkville for several years and used largely in Toronto, where of course it did not give satisfaction, and it is well known that slip glazed pipe is a thing of the past and will not answer the purpose. Years ago pipe was made at this factory in the same way, not having a clay that would stand the taking of a salt glaze. We have supplied and do at the present time supply all the pipe used in the following cities: Hamilton, St. Catherines, St. Thomas, Brantford and Chatham. London up in the present year got part of their pipe from the States. And until this year we supplied Kingston, the St. Johns Co. supplying part. Then all the smal towns, Sarnia, Strathroy, Dunaville, Guelph, Galt, Owen Sound, Barrie, Niagara Falls, have got all their pipe from us. Enclosed we have sent you a tabulated statement of the sewers in the city of Hamilton up to 1st January, 1888, and several miles have been laid this year.

At the back of this statement you notice certificate from City Engineer, showing that the pipes were all from our factory, except the 24-in. pipes imported from the States, and which gave very poor satisfaction, a large proportion of them having to be taken up. As this matter is of so much importance to us we will take the trouble to call on you the next time we are in your city. I have written Mr. Trotter, of the Standard Drain Pipe Co. of St. Johns P. Q., with whom I was connected, calling attention to it also. The output of the two factories will not be far short of $200,000 per year. Trusting you have ascertained that pipe larger than 6-in. are made in Canada, we are,

Respectfully yours,

THE HAMILTON AND TORONTO SEWER PIPE CO., (L'td.)
A. R. CARPENTER,
Pres.

The editor of the *Canadian Manufacturer* having solicited the opinion of Mr. Trotter, President of the Standard Sewer Pipe Co., of St. John, Que., regarding the statements contained in the article printed in this journal, that gentleman writes in reply as follows:—

"When our factory was started here in 1884, the question was at once raised by importers of Scotch pipe as to the strength and durability of our product, and the argument was advanced, 'Scotch pipe has been used here for fifty years, and is known to be of good and durable quality.' If you buy Canadian pipe you do not know what you are getting.' Notwithstanding which opposition, some of the large dealers took up the sale of our pipe, the article affording the utmost satisfaction. Pipe of our manufacture has been subjected to the most severe tests, and has proven to be first quality in every respect, not only fulfilling the requirements of engineers as regards resistance of crushing pressure, but far exceeding any possible requirement. For instance, our contract with the city of Montreal calls for twelve inch pipes which will sustain a crushing weight of 2,000 pounds to the square inch—but the official test, made by P. W. St. George, Esq., C. E., City Surveyor, shows that our twelve inch pipe withstood an average pressure of 5,696 pounds to the square inch, which was 3,696 pounds in excess of the requirement. In a competitive test as to the absorption of moisture made by Mr. St. George as between Scotch pipe and that manufactured by this company, the results showed that our pipe absorbed but one unit in forty-six units of pipe, while the Scotch pipe absorbed one unit in eighteen of its weight. This shows greater density of body and non-absorbing qualities two and a half times greater in our pipe than in Scotch pipe. Again, our pipe has been subjected to the 'smoke test' in competition with those brands of Scotch pipe most largely imported into Canada. The test was made in the Montreal corporation yard and conducted by R. P. Fleming, Esq., C. E., Engineer to the Sanitary Association of Montreal. In Mr. Fleming's report he says: 'A drain consisting of eight lengths of straight pipe and three junction pieces, was submitted to the crucial smoke test, which the pipe withstood in a most satisfactory manner; while a second drain of inferior pipe from another factory, when submitted to the same test showed numerous defects through which the smoke escaped in large quantities.' The drain of inferior pipe referred to was laid with Scotch pipe."

With a desire to do full justice to the manufacturers of Canadian sewer pipe, we have printed their statements and denials in full, and we cheerfully invite them to use our columns to any reasonable extent if necessary to sustain their position. Having thus we trust manifested our desire for fair play, we shall proceed to explain our own position in relation to this matter, and to publish such evidence as we have been able to obtain bearing on the case.

First of all, then, as to our own position. The reader will observe that the article in question states: "Upon receipt of the above letter, we instituted enquiries, with a view to obtaining the information sought for." The statements contained in the article are substantially in accord with the information supplied to the editor of this journal by the individual to whom he was recommended to apply for the facts requested by our correspondent. That individual was Mr. Robert Carroll, a well known dealer in sewer pipe in this city. Mr. Carroll's statements were condemnatory of the quality of Canadian manufactured pipe, and tended to show that a profitable opening existed in Canada for the establishment of a factory for the manufacture of pipe more nearly equal in quality to the imported article. Speaking on the subject Mr. Carroll said, that so far as he was personally concerned, he found it more profitable to handle imported pipe, and that consequently the establishment of another manufactory in Canada, would not benefit him directly. He added, however, that as citizens of Canada, we should seek to develop the country, and by so doing we would as a matter of course, be conferring indirect benefit upon ourselves. With the view, no doubt, of still further encouraging our correspondent in his purpose of engaging in the manufacture of sewer pipe in Canada, Mr. Carroll asked us to accompany him to the office of a gentleman named Mutton, on Adelaide street east, who was the owner of a bed of clay which had been declared to be well adapted for the manufacture of sewer pipe. Mr. Carroll introduced us to Mr. Mutton, who explained to us the nature of the clay, and the location and extent of the deposit. He stated that a sample of the clay was among the exhibits from Ontario at the Cincinnati Exhibition, where it attracted considerable attention, and where, possibly, our correspondent might have seen it. At Mr. Mutton's suggestion we took a sample of the clay, and forwarded it with a letter, setting forth all the information we had received, to our correspondent.

We did not solicit the information with a view to its publication, but simply for the purpose of putting our correspondent in possession of it. In looking over our letter file last month, we came upon our correspondent's letter, and we then formed the intention of publishing it, together with the information received from Mr. Carroll and embodied in our letter replying to our correspondent's enquiries.

Upon reading the denials of the Canadian sewer pipe manufacturers to the statements contained in our article, we at once set to work to make a full investigation into the whole subject. We addressed the following enquiry to the City Engineers of the leading cities throughout Canada:

DEAR SIR,—Will you be kind enough to inform me, what proportion of imported sewer pipe, and what of Canadian manufacture is used in your city? What proportion of the imported pipe comes from Scotland, and what from the United States? Will you also kindly give me your opinion regarding the comparative quality of Canadian, American and Scotch pipe? An early reply will greatly oblige,

Yours truly,
C. H. MORTIMER,

The replies which have been received to these letters appear below.

With the object of getting further information to sustain the statements made in our previous article, a representative of this journal called on Mr. Carroll a few days ago, but was surprised to learn from that individual that he had almost entirely forgotten the interview with the editor of this paper. Our representative was still more surprised when Mr. Carroll denied that the information contained in the article was furnished by him, and assuming a position exactly the opposite of that which he had taken in the previous interview, proceeded to argue that the pipe manufactured at St. John, Que., was fully equal in quality to American pipe. Our representative, not being personally in a position to dispute Mr. Carroll's denials, left, with the latter's promise that when Mr. Trotter, President of the Standard Drain Pipe Co., should visit Toronto a day or two later, he would accompany him to the publication office of this journal, and there discuss the matter. A few days after, learning that Mr. Trotter had arrived in the city, we sent a message to Mr. Carroll asking him to bring the gentleman over, which he did.

We were at a loss to understand Mr. Carroll's conduct, but met him with an honest desire to discuss matters in a friendly way. He opened the discussion by admitting that his recollection of the previous interview was exceedingly vague, but upon being reminded of the statements he had made, his recollection suddenly became clear as noonday, and he characterized as untrue every statement attributed to him. Up to this time we had supposed that Mr. Carroll was laboring under some misapprehension, but when he denied in detail, in language more forcible than gentlemanly, every one of his previous statements, the truth dawned upon us that, for reasons best known to himself, he had determined to repudiate everything he had said, and if possible, shift the responsibility for his statements from his shoulders to ours. Because we firmly declined to be placed in such a false position, Mr. Carroll allowed his anger to get the better of his honest judgment as well as of his sense of politeness, and charged us with uttering wilful falsehoods. In vain we reminded him that twice previously he had admitted the indistinctness of his recollection of what took place at the first interview, and that in the light of this, and of the fact that we made notes of the interview at the time it took place, his claim to greater accuracy of knowledge than ourselves was ridiculously inconsistent—he was not in a reasoning mood, and evidently chagrined to find that he could not bulldoze us into relieving him of the onus of statements, the authorship of which he is justly entitled to bear, he left us without even saying adieu.

In Mr. Trotter we found a gentleman whose better acquaintance we shall esteem it an honor to possess.

Having placed the responsibility for the statements contained in our previous article where they justly belong, we present for the consideration of those interested the evidence touching the relative quantity and quality of Canadian and imported sewer pipe used in this country:

OTTAWA, November 7th, 1888.

Publisher CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—Replying to yours of the 5th inst., I would state that the corporation of the city of Ottawa does not permit the laying of any other brand but Scotch vitrified clay pipes. We have had no experience with American pipes, and while their quality may be good, we are situated so in the east, that railway freights and high cost at works, precludes their competition here with Scotch brands.

Yours very truly,
E. E. PERREAULT,
City Engineer.

CITY ENGINEER'S OFFICE,
ST. JOHN, N. B., 6th Nov., 1888.

Publisher CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In answer to your inquiry I beg to say that *all* the sewer pipe used here is imported (terra cotta) and is imported from Scotland—at least I never heard of any other. At one time we used to get some from Nova Scotia, (Enfield,) but it was not satisfactory, and, I have been told, its manufacture has been discontinued.

Cement sewer pipe is made at St. Stephens, in this Province, by Mr. Vroom, but I have no experience of its character. Twelve inch terra cotta costs here 55 cents per foot, and other sizes in proportion. Any further information I can give you on this subject or any other matter I will cheerfully furnish.

Yours very truly,
HURD PETERS,
City Engineer.

KINGSTON, ONT., Nov. 8th, 1888.

Publisher CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In reply to yours of yesterday, I beg to say, that we use Scotch sewer tile altogether here. The city did put in some Canadian pipe before my time, but I am not aware that any American was ever used here.

I am not at all acquainted with American sewer pipe, consequently can give no opinion on it, but I must say I prefer Scotch pipe to any Canadian I have ever seen.

Yours very truly,
J. O. BOLGER,
City Engineer.

CITY ENGINEER'S OFFICE,
HALIFAX, N. S., 9th Nov., 1888.

Publisher CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In reply to yours of 5th inst., the bulk of drain pipe hitherto used in this city is of home manufacture. Smith & Kaye of Enfield, N.S., were formerly the makers. Lately the work has been carried on by H. C. Preedy. Within the past year some pipe from St. John, P.Q., has been used, and Dutton's pipe, (London) are sometimes imported by local builders. No American pipe has been used to my knowledge. The English pipe are the best I know of here. The demand is principally from builders and private parties. The city uses very few pipe for drains or sewers, except for sizes under 12 inches. When drains are required of larger dimensions, either brick or concrete is used.

Yours truly,
E. H. KEATING.

LONDON, ONT., Nov. 13th, 1888.

Publisher CANADIAN ARCHITECT AND BUILDER, Toronto.

DEAR SIR,—In reply to yours of the 5th I beg to say, that owing to our being so far west, we never use any Scotch sewer pipe, the freight making it too expensive. We therefore use Canadian and American pipe, and find these very good, the Canadian pipe being quite equal to the American. The only fault that can be sometimes found with the Canadian is, that they are not sufficiently burnt, but that is a fault only occurring rarely.

Yours truly,
THOMAS H. TRACY,
City Engineer.

CITY ENGINEER'S OFFICE,
MONTREAL, Nov. 12th, 1888.

Publisher CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In reply to your letter of the 5th instant, I beg to say, that the city have had a contract with the Standard Drain Pipe Co., of St. John this year, and I have found their pipes to be of good quality. It is impossible for me to tell the exact proportion of Canadian, American or Scotch sewer pipe used in this city, as we receive pipe from all countries. I have made a great many tests, and it gives me pleasure to say that the Canadian pipe compares most favorably with any imported from Europe. The city contracts for sewer pipes are open to competition to everybody, and as the Standard Drain Pipe Co., of St. John, happened to be the lowest, it was given to them. As long as the pipe is of good quality and gives us satisfaction, it is the one we usually adopt.

Yours truly,
PERCIVAL W. ST. GEORGE,
City Surveyor.

Mr. Edward Terry, one of the largest dealers in sewer pipe in the city, was asked to read the article in question and give his opinion concerning the correctness of the statements therein contained. Having read the article, he said: "I consider your article fair and true." He added that the Canadian manufactured pipe was not up to the standard of the Scotch and American. In his opinion, the St. John pipe was better than the Hamilton pipe, owing to the fact that the former contained a proportion of fire-clay, which the latter did not. The St. John pipe was roughly finished as compared with imported pipe. He had seen St. John pipe that was equal to American, but the output of the St. John factory was not even in quality. Regarding the test which Hamilton pipe was said to have withstood, he was in a position to make an explanation. He had urged the Hamilton people to improve the quality of their pipe by using about one-third fire-clay in its composition, and had consented, if this were done, to handle their pipe. A short time ago, he received from the Hamilton factory some samples of pipe manufactured in the way he had suggested, with the request that he would put his name on them and have them submitted to a test, without mentioning the name of the manufacturers, unless the test should prove satisfactory, in which case he was to make it known that the pipe was made by the Hamilton & Toronto Sewer Pipe Co. He put his name on the pipe and had them tested, the result being entirely satisfactory. Those pipes, however, were made in a different manner from the pipe ordinarily manufactured at this factory—they were made specially for testing. If the Canadian factories would place on the market a grade of

sewer pipe equal to this special sample, he ventured to say no imported pipe would be sold in this country. The Canadian manufacturers were quite competent to turn out such a grade of pipe, if they would use the proper materials and exercise greater care in manufacturing.

Mr. John Maloney, another large dealer, said: "I quite agree with the statements contained in the article in the CANADIAN ARCHITECT AND BUILDER. We either want a new sewer pipe factory that will make pipe equal to that imported, or the present factories to bring the quality of their output up to the American standard. The architects refuse to specify Canadian pipe. Although I sell from 75 to 80 per cent. of Hamilton pipe, I must say I think your article fair.

Opinions similar to the above have been given by other dealers, which simply goes to prove that, aside from the correctness of the opinions expressed, Mr. Carroll, in making the statements he did, was expressing his honest convictions, which it is now evident he would not have done if he had known his statements would be given to the public. As Mr. Carroll is attempting to shirk the responsibility for his statements, and furthermore charged the editor of this journal in the presence of Mr. Trotter, "with uttering untruth" with intent;" we have taken the trouble in the annexed affidavit, to affirm under oath that the statements contained in our article are substantially in accord with the information supplied to us by Mr. Robt. Carroll:—

I, Charles Herbert Mortimer, of the City of Toronto, in the County of York, Editor and Publisher, do solemnly declare that the article in the CANADIAN ARCHITECT AND BUILDER for October, headed "Proposed New Sewer Pipe Manufactory in Canada," was written from information supplied to me by Mr. Robert Carroll, of the City of Toronto, and the matter contained in said article is substantially in accord with the information given by the said Robert Carroll.

And I make this solemn declaration conscientiously believing the same to be true and by virtue of the "Act respecting extra-judicial oaths."

Declared before me at the City of Toronto, in the County of York, this sixteenth day of November, A.D., 1888. } C. H. MORTIMER.

WM. DAVID MCPHERSON,
A Notary Public for Ontario.

This is our case. We leave the public to judge of its merits.

PLASTER.

FEW people have an idea, says the *California Architect*, what a valuable material plaster of paris is, and how it enters into the things of every day life about us, from the hard finish on the wall to the lamp collar which is fastened with it.

It is found in raw state in almost every land, and is made of gypsum rock, (a sulphate of lime.) It is quarried, calcined, ground to various degrees of fineness and then encalcined or boiled in huge cauldrons, and is then fit for use. The best is made mostly in New York, from rock quarried in Nova Scotia, and is the kind used by dentists for all sorts of fine castings. We get another on account of a blue cast in it. This kind is used mostly for hard finishing on walls. Another grade, coarser plaster, comes from Iowa, which has been used extensively for what it called "stucco plastering," in which a mortar is made of one part of plaster to two of sand and enough glue size to keep it from settling too quick. It makes one of the hardest kind of walls, but can be attempted only by the most skilled mechanic.

Plaster in setting can be retarded or accelerated by the use of various ingredients. Glue size is best for retarding as it makes it materially harder after it is dry. Sugar, molasses and cream of tartar can be used for the same purpose. Cream of tartar is dangerous to use, as a little too much will kill the plaster from settling entirely. Two of the best things to use in making plaster set quick are common salt or alum. Plaster that has been kept a long time and has gathered moisture, or that has been set in a damp place, will also set quick. This can be remedied by removing all lumps that may have formed, and heating it on a stove in some metal vessel. When heated it will appear to boil like a liquid. Gronkd, uncalcined plaster is used extensively to improve what are called sour lands. Plaster in setting heats slightly which causes it to expand. An eminent authority claims that this expansion will cause it to fill the crevices of a mold. But this is a mistake, as the expansion does not take place until it is quite hard.

A good quality of slate, blue-black in color, smooth surface and good grain, suitable for roofing slate, mantels, etc. is reported to have been discovered near the C. P. R. track, east of Golden, in the Northwest.

The Kingston *News* says the new terra cotta works being built at Deseronto by Rathbun Company will be the largest in Canada. The main building is 262 feet in length and 77 feet wide. The south-east extension is 180x20 feet, with three stories, and is chiefly used for drying purposes. The south wing is 170x69 feet, three stories high. Part of its ground floor is fitted up with hot-air tunnels for drying red brick; the other floors are used for drying terra cotta ware. In the south wing the different floors give an area of 38,760 feet for drying purposes, and this, added to the 21,600 feet in the main building, gives a total area for drying purposes of 60,360 feet. A large trestle runs through the entire length of the main building, on which run the railway cars carrying the clay and fuel for the works. The new burning kiln has been finished and will contain about 80,000 bricks. A track runs south of the large burning kiln for convenience in loading cars for shipment of material.

THIS SPACE RESERVED FOR THE

SANITAS MFG. CO.

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Sole Agent for Canada.

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AGENT,
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Esplanade
Street,
TORONTO.

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OTTAWA, ONT.

"SILICOLITE," (Patent)

A CHEAP FIRE AND WATER-PROOF ELASTIC FOR PLASTERING HOUSES.

Is not liable to crack under any strain, and requires no special preparation for painting either in oil or water color. Being a non-conductor of heat, it makes a house cooler in summer and warmer in winter, and its weight is from 15 to 20 times less than any other plastering in use. It adheres to any kind of surface, and when applied to stone or brick on outside walls will protect them against the action of frost. It is applied in the usual way of plastering, and can be highly finished on one or two coats either with the ordinary tool or with sand paper.

A. J. PIGEON, - No. 30a Richmond Square, Montreal.

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CORNCOCKLE RED SANDSTONE,

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STEAM AND HAND POWER CRANES.

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ART STAINED GLASS WORKS,

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Of Every Description.

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D. BELL, - MANAGER.

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Yale & Towne Mfg. Co.'s	*"BOWER-BARFF" GOODS.*
Chicago Spring Co.'s	*DOUBLE ACTION SPRING HINGES.*
B. G. Tisdale's	*IRON STABLE FITTINGS.*

Write for full particulars of above goods.

AIKENHEAD & CROMBIE,

- TORONTO.

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

HAVELOCK, ONT.—The Presbyterians will erect a new church here.

BEDFORD, QUE.—A new Methodist church is about to be erected here.

DUNDAS, ONT.—A company is being formed to rebuild the curling and skating rink.

MARKHAM, ONT.—The by-law to raise $7,500 for waterworks was carried by a majority of 24.

SPRINGHILL, N. S.—The adoption of the electric light system of street lighting is talked of here.

DUNDAS, ONT.—The by-law providing for the extension of the waterworks system has been carried.

EXETER, ONT.—Messrs Veidy & Son will build an addition to their foundry to cost about $10,000.

SMITHS FALLS, ONT.—The congregation of St. Andrew's Church is about to build a $2,500 manse.

TORONTO, ONT.—The management of the Ontario Veterinary College contemplate the erection of new buildings next year.

PORT ARTHUR, ONT.—A by-law has been carried by three of a majority authorizing the expenditure of $5,000 for the purchase of a site for a customs house and post office. An effort will be made to quash the by-law on the grounds that the government should bear the cost of the structure.

STRATFORD, ONT.—The Stratford Water Supply Company have decided to erect a stand pipe costing between $16,000 and $17,000.

BRANTFORD, ONT.—The By-Laws to raise $185,000 and $10,000 for waterworks and drill shed purposes respectively, have been carried.

COLLINGWOOD, ONT.—Three by-laws to raise $85,000 for water works, electric light and market buildings are before the people of this town.

WINNIPEG, MAN.—Plans are being prepared at the Department of Public Works, Ottawa, for a new building at Batoche for the Mounted Police.

HALIFAX, N.S.—The Government is asking tenders for the erection of a large warehouse at the Richwood terminus of the Intercolonial railway.

ST. ANDREWS, N. B.—Among the improvements contemplated here is a large hotel, gravitation system of water supply, and an electric light plant.

WOODSTOCK, ONT.—It has been decided by the Senate and Board of Governors of McMaster University, to expend $25,000 on improvements for Woodstock College.

LONDON, ONT.—The city council of London Ont., has decided to offer the Grand Trunk Railway company a cash bonus of $100,000, to rebuild their car shops. The McClary Manufacturing Co. will erect a new four storey building.

LAKEFIELD, ONT.—The By-Law to raise $10,000 for a fire hall and council chamber, and also for the purchase of a first-class steam fire engine and hose reels, and for the sinking of tanks throughout the village has been carried.

OTTAWA, ONT.—It has been finally settled that a ship railway is to be constructed from the Bay of Fundy to Baie Verte, at a probable cost of $5,000,000. The first ship railway in the world is therefore to be constructed in Canada. Mr. J. C. Keefer, President of the American Society of Civil Engineers is one of the Provincial directors named in the Act of Parliament incorporating the Chignecto Marine Railway Company.

THE RIGHT USE OF TERRA-COTTA.

THE assertion that terra-cotta ought to be used in small pieces like bricks, because it is a sort of a brick, and not in large pieces that might be mistaken for stones, is an idle assertion and a mischievous one, for it would limit its profitable use. If it fulfills the purpose for which it is wanted, what does it signify whether it is like stone or brick? What can it matter whether a soft material becomes hard by artificial or natural processes? We want a certain form—in one case it is moulded, in the other, cut, for use or appearance the result is the same. Why should we be troubled with plausible theories which puzzle the weak, and attempt to limit at once our art and our use? If a material is unfit for the use to which it is applied it will not be used; but if it is fit, it is rediculous to prove from "true principles" that it ought not to be used. Take, for instance, a cornice. The line of argument is this: A cornice is a stone structure, and a deep cornice can only be made of large stones. Terra-cotta is nothing more than brick, and, therefore, ought to be small, and consequently is not adapted to large cornices. I reply that terra-cotta can be and is made in large pieces, and that cornices are made of it, and that in every respect it fulfils its practical and artistic purpose.—*The Architect.*

Mr. Wm. Haywan has obtained the contract to erect the large addition to the McLary Mfg Co's Works, at London, Ont, and will introduce a new feature in construction in that city, viz.: a derrick for lifting bricks and mortar to the upper stories.

It is expected that the new drydock at Halifax, N. S., will be completed before the close of the year. The caisson, or floating gate, will be 100 feet long and 36 feet high, and is to have 250 tons of stone ballast. Pumping machinery is being erected which is to empty the dock in about three hours. The walls are very massive, being from three feet to ten feet in thickness, according to the heads in the rock shaken loose by blasting, and which look as if built of one stone. Some 5,000 tons of cement will be required in its construction, and 52,000 cubic feet of granite. Attached to the dock are all the work-shops necessary for repairs to vessels and machinery.

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins..	$30 00@	32 00
1¼ and thicker, three uppers, Am ins.		37 00
1¼ and thicker, pickings, Am ins.....		27 00
1 x 10 and 12 dressing and better......	20 00	22 00
1 x 10 and 12 mill run..............	15 00	16 00
1 x 10 and 12 dressing..............	15 00	16 00
1 x 10 and 12 common..............	12 00	13 00
1 x 10 and 12 spruce culls...........	10 00	11 00
1 x 10 and 12 maple culls............		9 00
1 inch clear and picks...............	23 00	25 00
1 inch dressing and better............	18 00	20 00
1 inch siding, mill run...............	13 00	15 00
1 inch siding, common..............	12 00	13 00
1 inch siding, ship culls.............	10 00	11 00
1 inch siding, mill culls.............	8 00	9 00
Cull scantling.....................	8 00	9 00
1¼ and thicker cutting up plank......	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run....	14 00	16 00
1 inch strips, common..............	11 00	12 00
1¼ inch flooring...................		15 00
1½ inch flooring...................		15 00
XXX shingles, sawn................	$2 40@	2 50
XX shingles, sawn.................	1 30	1 50
Eastlake painted iron shingles, per square, (10 feet)................		4 50
Eastlake painted tin shingles, per square....................		4 50
Eastlake genuine galvanized iron shingles, per square................		7 00
Imitation brick siding, per square.....		3 50
Special siding, per square...........		3 50
Lath, sawn.......................		1 80

YARD QUOTATIONS.

Mill cull boards and scantling........		10 00
Shipping cull boards, promiscuous widths.....................		12 00
Shipping cull boards, stocks........		13 00
Scantling and joist, up to 16 ft.......		14 00
" " 18 ft.......		15 00
" " 20 ft.......		16 00
" " 22 ft.......		17 00
" " 24 ft.......		19 00
" " 26 ft.......		20 00
" " 28 ft.......		22 00
" " 30 ft.......		24 00
" " 32 ft.......		26 00
" " 34 ft.......		28 50
" " 36 ft.......		30 00
" " 38 ft.......		32 00
" " 40 to 44 ft..		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board,	18 00	20 00
Dressing stocks....................	16 00	18 00
Picks, American inspection..........		40 00
Three uppers, American inspection....		50 00
Cedar for block paving, per cord......		5 00
Cedar for Kerbing, 4 x 14, per M....		12 00

B. M.

1¼ inch flooring, pressed............	25 09	30 00
1½ inch flooring rough..............	14 00	15 00
1¼ " dressed............	23 00	25 00
" undressed..........		14 00
" dressed............	16 00	20 00
" undressed..........	12 00	14 00
Beaded sheeting, dressed............	18 00	20 00
Clapboarding, dressed..............		12 50
XXX sawn shingles, per M...........	2 75	2 90
Sawn lath........................		2 25
Red oak.........................	20 00	25 00
White...........................	25 00	30 00
Basswood, No. 1 and 2.............	18 00	20 00
Cherry, No. 1 and 2................	50 00	60 00
White ash, No. 1 and 2.............	25 00	30 00
Black ash, No. 1 and 2.............	20 00	25 00

BRICK.—℔ M.

Common Walling..................		$ 7 50
Good Facing......................		10 00
Sewer............................		9 50

Stone:

Common Rubble, Per Toise, delivered		14 00
Large flat " " "		18 00
Foundation Blocks, " Cubic Foot..		35

Slate: Roofing (℔ square).

" green..................	5 00	6 00
" " unfading........	5 00	6 00
" purple................	5 00	6 00
" red....................		10 00
" black, Lehigh.........	3 50	4 00
" " Chapmans......	——	——
" unfading black, Monson, Me..........	5 50	8 00
" black slate...........		7 50
Tiles, American, ℔ M.............		
N. Peach Bottom, warranted unfading		

Sand:

Per Load of 1¼ Cubic Yards.......		1 5

PAINTS. (*In oil, ℔ lb.*)

White lead, Can....................	6	6 50
" zinc, Can....................	6½	8 50
Red lead, Eng......................	5½	6½
" venetian....................	6½	7½
" vermilion...................	90	1 00
" Indian, Eng................	10	12
Yellow ochre......................	6½	12
Yellow chrome.....................	15	25
Green, chrome.....................	7	12
" Paris......................	30	40
Black, lamp.......................	17	25
Blue, ultramarine..................	15	25
Oil, linseed, raw (℔ *Imp. gal.*)......		56½
" " boiled, "		59
" " refined, "		60
Turpentine, "	55	59
Varnish, coach, "		
Shellac, "		
Putty............................	2¾	3
Whiting, dry......................	75	1 00
Paris white, Eng., dry..............	1 25	1 50
Litharge, Am., "	6½	8
Llanna, burnt.....................	15	20
Umber "	8	12¼

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey..		40
" " " White		60
Plaster, Calcined, New Brunswick..		2 20
" " Nova Scotia......		2 10
Hair, Plasterers', per bag...........		1 00
Cement, Portland, per bbl...........		3 00
" Thorold, "		1 50
" Queenston, "		1 50

HARDWARE.

Cut Nails:

American Pattern, 1¼ inch, per keg....		4 35
" " 1½ to 1¾ inch, per keg		3 60
Canadian Pattern, 1¼ inch, per keg...		3 85
" " 1½ to 1¾ inch, per keg		3 25
" " 2 to 2¼ inch, "		3 35
" " 2½ to 2¾ inch, "		3 10
" " 3 inch and larger......		2 85
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg........		6 05
" " 1¼ inch, "		5 30
" " 1½ " "		5 05
" " 1¾ " "		3 60
" " 2 inch and larger......		4 00

Iron, etc.

Refined, ℔ 100 lb. or ordinary size.....		2 35
Common, ℔ 100 lb..................		2 10
Patent metals, ℔ lb.................		0 11
Anchors, ℔ lb......................		0 06
Chain cables, ℔ lb..................		0 06
Rigging chains, per lb...............		0 3⅔

MONTREAL PRICES.

Lumber, Etc.

Ash, 1 to 4 in., M..................	$13 00@	20 00
Birch, 1 to 4 inch, M...............	16 00	25 00
Basswood.........................	13 00	18 00
Walnut, per M.....................	55 00	95 00
Butternut, per M...................	25 00	40 00
Cedar, flat........................	00 06	00 10
Cherry, per M.....................	65 00	90 00
Elm, Soft, 1st.....................	15 00	17 00
Elm, Rock........................	25 00	30 00
Maple, hard, M....................	20 00	22 00
Maple, Soft.......................	16 00	18 00
Oak, M...........................	40 00	90 00
Pine, select, M....................	35 00	40 00
Pine, 2nd quality, M...............	21 00	23 00
Shipping Culls....................	13 00	15 00
Mill Culls........................	8 00	10 00
Lath, M..........................	1 80	1 90
Spruce, 1 to 2 inch, M.............	10 00	11 00
Spruce Culls......................	4 50	6 00
Shingles, 1st quality...............	2 00	3 00
" 2nd "	1 25	2 00

Cement, etc.

Portland Cement, per barrel..........	$ 2 45@	2 75
Roman " "	2 75	3 00
Fire Bricks, per M..................	22 00	30 00

Cut Nails:

Hot-cut Am. or Can. pattern, 3 inch and above.....................		$2 65
Hot-cut Am. or Can. pattern, 2¾ inch and above.....................		2 90
Hot-Cut Am. or Can. pattern, 2¼ and 2 inch......................		3 15
Am. pattern, 1½ and 1¾ inch hot-cut		3 40
" " 1¼ inch " "		4 15
Can. Pattern, cold-cut, 1½ and 1¾ inch		3 15
" " 1¼ inch......		3 65
Finishing Nails, per 100 lb. keg, 1¼		4 50
Finishing Nails, per 100 lb. keg 1½ to 1¾ inch.....................	4 25	4 00
and 1¼ inch.....................	$ 5 25	4 70
Finishing Nails, per 100 lb. keg, 2 inch and up....................	3 65	3 50

Paints, etc.

White Lead, pure, 25 to 100 lb. kegs.	6 00	0 00
" No. 1..................	5 25	5 50
" No. 2..................	4 75	5 00
" No. 3..................	4 50	4 75
" dry..................	5 25	5 75
Venetian Red, English..............	1 50	1 75
Yellow Ochre, French..............	1 25	3 00
Whiting, London, washed............	0 50	6 00
" Paris, "	1 15	1 25

Oils:

Linseed, raw......................	0 62	0 60
" boiled....................	0 60	0 62
Oive, pure.......................	1 10	0 00
" machinery.................	0 90	1 00
" extra, qt., per case.........	3 00	3 25
" pts., "	2 40	2 60
" ½ pts., "	2 70	3 07
Spirits turpentine..................	0 63	0 65

ST. JOHN, N. B.

Lumber.

Spruce deals, Bay Fundy Mills........	8 00	8 25
Spruce deals, City Mills.............	8 50	9 50
Aristook P. B. Nos. 1 and 2..........	40 00	45 00
No. 3............................	30 00	35 00
No. 4............................	15 00	20 00
Aristook P. B. shipping.............	15 00	16 00
Common.........................	12 00	13 00
Spruce boards....................	7 00	8 00
Spruce scantling (unst'd)...........	7 00	8 00
Spruce, dimensions................	11 00	14 00
Pine clapboards, extra..............	5 00	40 00
No. 1............................	0 00	30 00
No. 2............................	30 00	20 00
No. 3............................	11 00	12 00
Laths, spruce.....................	1 25	1 35
Laths, pine.......................	5 50	8 00
Palings, spruce...................	5 50	8 0

Iron, etc.

Refined, ℔ 100 lb or ordinary size.....	2 25	0 00
Pommon, 100lb....................	2 10	0 00
Aatent metals, ℔ lb................	0 00	0 11
Cnchors, ℔ lb.....................	0 00	0 00
Chain cables, ℔ lb.................	0 03	0 06
Rigging chains, ℔ lb...............	0 03	0 3⅔
Galvanized Iron Roofing, per square..		5 00

Nails.

Cut, 3dy, ℔100lb...................	3 75	4 00
Cut, other sizes....................	2 74	3 50
Ship Spikes......................	3 70	5 00
Galvanized.......................	5 25	6 50

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Fine Art Engraving, Portraits, etc.

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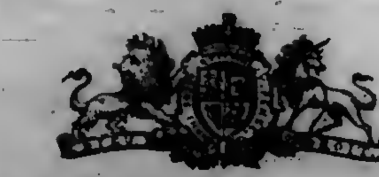

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for McGregor's Creek," will be received at this office until Friday, the 23rd November next, for the construction of pile protection work at McGregor's Creek, town of Chatham, Kent County, Ontario, in accordance with a plan and specification to be seen at the Department of Public Works, Ottawa, and on application to Mr. A. McDonnel, C.E., P.L.S., Chatham.

Tenders will not be considered unless made on the form supplied and signed with the actual signatures of tenderers.

An accepted bank cheque, payable to the order of the Minister of Public Works, equal to *five per cent. of amount of tender*, must accompany each tender. This cheque will be forfeited if the party decline the contract or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

By order,
A. GOBEIL,
Secretary.

Department of Public Works,
Ottawa, 29th October, 1888.

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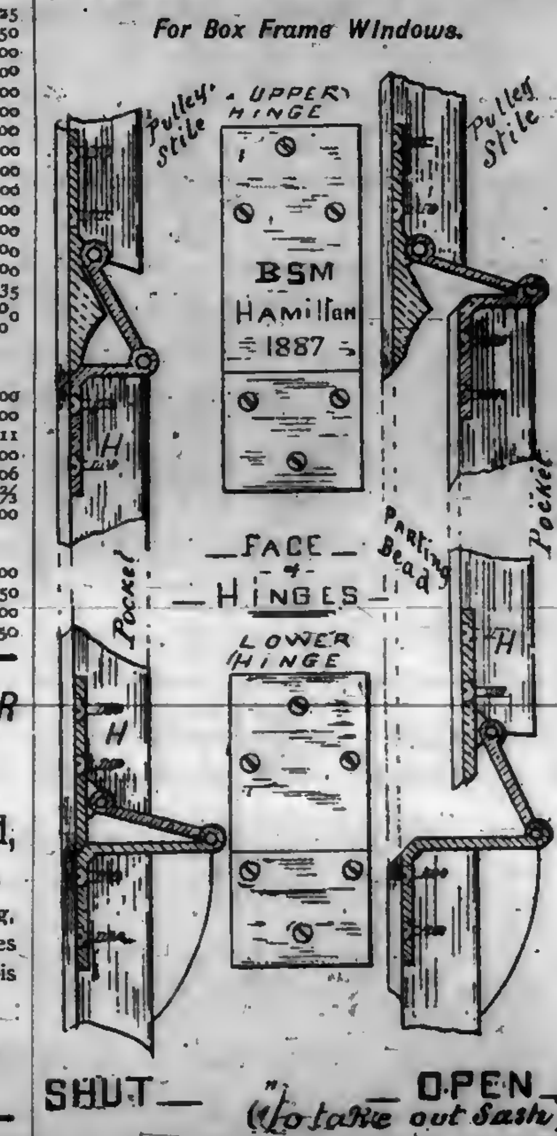
- IMPROVED -

PULLEY STILE HINGE

For Box Frame Windows.



WITH the above hinges the ordinary double hung window sashes can be taken out of the frames for cleaning, &c., without disturbing the stops or parting beads, and are the result of long experiment, to insure strength and perfect action. The parting beads are cut to mitre, and slide in with the pockets H, to clear the check of sash—thus the sash recedes in at one side, and clearing the opposite parting bead is taken out, the pulley boxes are in the pockets H, and the lines are held in a lock plate on inside of sash by means of a knot on the end of the line, which is released and run up to the pulley box in taking out the sash. The attention of architects and builders is called to these hinges. For further information and price apply to the inventor,

J. H. YOUNG,

117 KING ST. WEST, - HAMILTON, ONT.

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Warden King & Son

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The "Sectional," "Champion" and "Daisy"—the leading Hot Water Boilers of this continent.

3,000 in use. Send for testimonials and prices.

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This Waiter is very favorably known in the United States; it is the most complete thing of the kind, being also cheap, substantial and durable. No house should be without one. Descriptive pamphlet sent on application.

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Soil and Greenhouse Pipes and Fittings, Steam and Hot Water Fittings, Plumbers' Wares, Columns, Girders, circular and straight Iron Stairs, and all kinds of House and Machinery Castings.

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"ECONOMY" Scotch Wrought Steel Plate Furnaces.

The Acme of Perfection in Sanitary Heating.

Indorsed by the medical profession and sanitary authorities as the BEST and MOST FAVORABLE TO HEALTH. The "ECONOMY" does not burn the air, but reproduces the pure external atmosphere *warmed only* to a proper temperature for respiration. Send for descriptive catalogue, or call and examine these celebrated Furnaces; the most durable, the cheapest, the best. *They burn less coal than any other Furnace made. They are absolutely free from gas or dust. They have the largest heating capacity of any Furnace manufactured.* Our "ECONOMY" Combination Steam and Warm Air Furnace is peculiarly adapted to heating large buildings. We introduce pure fresh air into the building, thus overcoming the great objection to any system of steam or hot water heating. Every Furnace we put in is covered with a full guarantee to give satisfaction.

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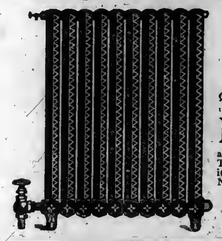

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PATENTED 1886 IN CANADA AND THE UNITED STATES. THE BEST HOT WATER RADIATOR IN THE MARKET.

Quick Circulation; Easily Repaired; Its Capacity increased at very Little Extra Cost; does not need a Fancy Cast Iron Top or Marble Slab; in fact, Just the Radiator that Suits the Requirements of the Market.

BY the construction of this Radiator, each section has (entirely distinct from each other) a separate and positive circulation within itself, producing not one slow, sluggish, continuous circulation, but as many sharp and constant circulations as there are sections composing the Radiator, thereby maintaining a greater heat from a given surface. It has another advantage that will be appreciated by the Trade: the inlet and outlet are both at the same end, and has been arranged that it may be used for Hot Water or Steam without making any changes to the connections, or any alterations whatever—a feature possessed by no other Radiator that we are aware of. We also claim that with this Radiator any person in the Trade can replace a section, or add sections to increase its capacity, without returning it to the manufacturer. This alone is an advantage, particularly in cases outside the city in which it is manufactured. These Radiators are now fitted up in the following buildings, viz., Hull Post Office, Peterborough Post Office, Pictou Custom House, N.S.; Pictou Marine Hospital, N. S.; Winnipeg Custom House, Kingston Custom House, Three Rivers Custom House, Point St. Charles Post Office, and many other private dwellings.

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BUFFALO SEWER PIPE COMPANY,

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VITRIFIED DRAIN AND SEWER PIPE.

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Black Rock, BUFFALO, N. Y.

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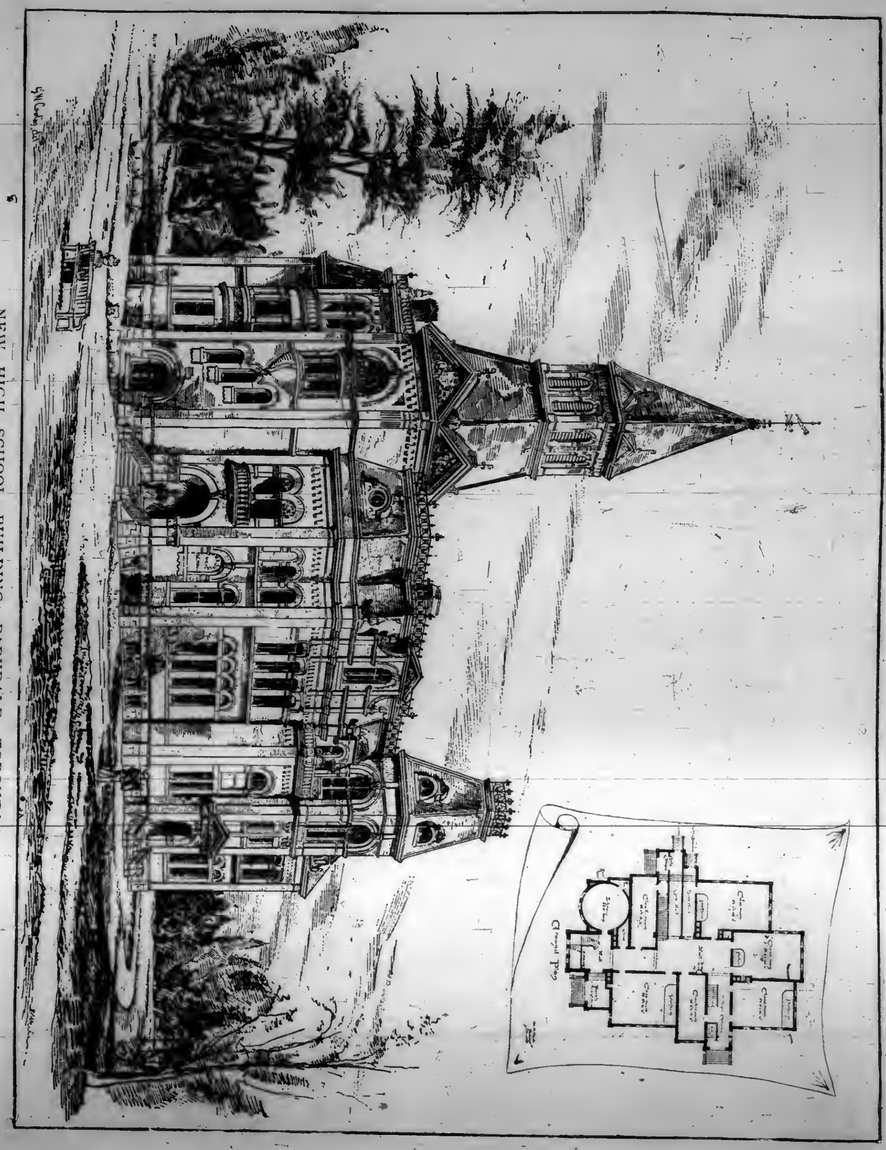

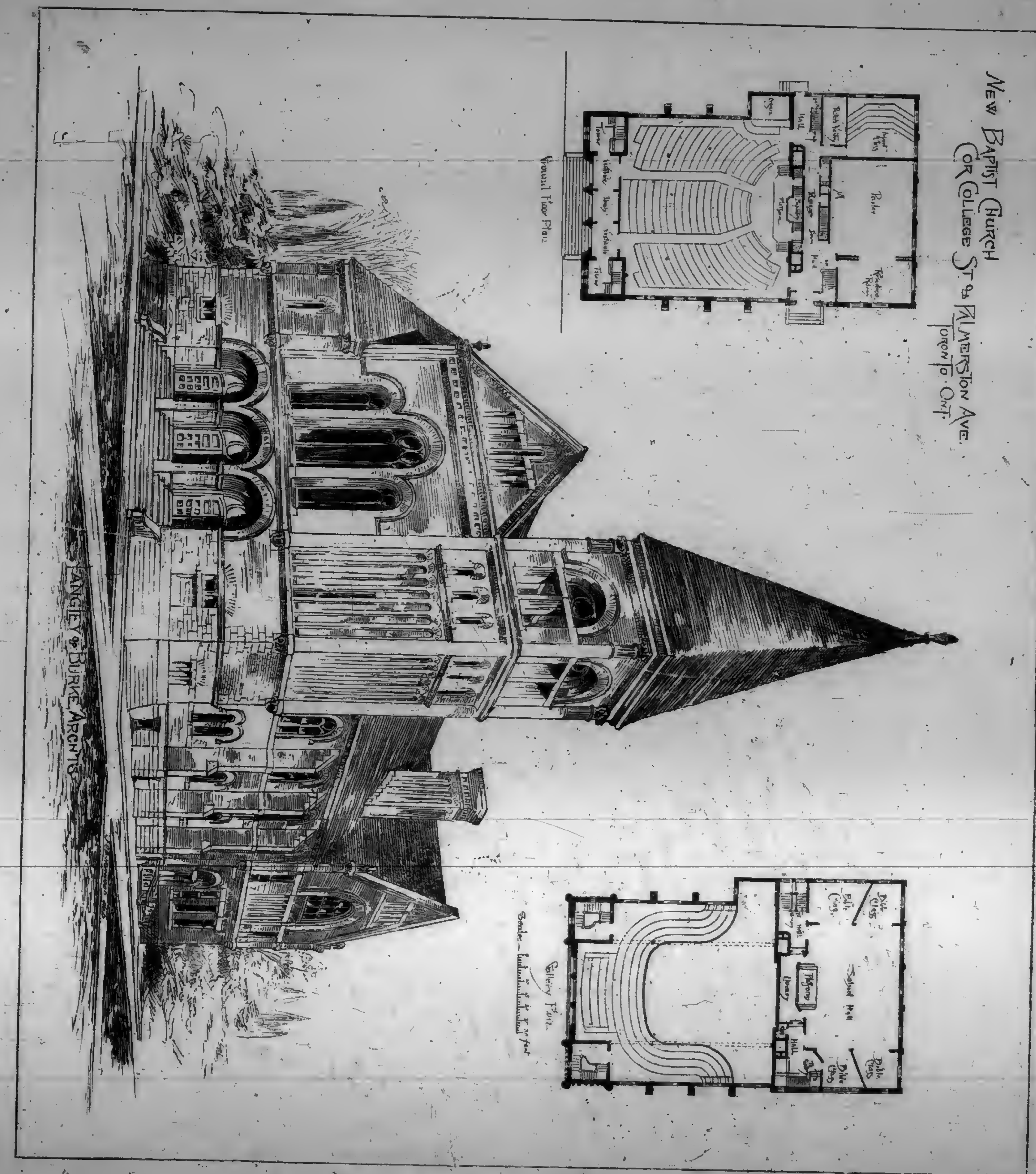
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VOL. I.—No. XII. TORONTO, CANADA, DECEMBER, 1888. PRICE 20 CENTS $2.00 PER YEAR.

—THE—

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

PUBLISHED MONTHLY IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

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"A WORD TO THE WISE," ETC.

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Dear Sir,—You will please renew our contract with you for advertising for the ensuing year. We will send change of copy in time for January number. We wish to add that we have received more valuable enquiries from our advertisement with you than in any other medium where we are represented.—

Yours truly,
F. S. EVANS,
Pres. and Gen. Manager.

VOLUME I. of the CANADIAN ARCHITECT AND BUILDER closes with the present number. It seems fitting that on the anniversary of the establishment of this new enterprise, a word or two should be said regarding the measure of success which has already been achieved, and the means to be adopted for ensuring greater and permanent success in the future. A backward glance over the past year gives no cause for discouragement. The publishers' anticipations have in many respects been more than met, and he feels encouraged to put forth renewed efforts to improve the character and value of the publication in the new year upon which it is about to enter. Sincere thanks are tendered to those who have manifested their appreciation of the aims and objects of this journal, by extending to it liberal advertising patronage, and by giving their names as subscribers.

It is a pleasure to be told by our subscribers that the CANADIAN ARCHITECT AND BUILDER has steadily improved from the first number. Our determination is, that the march of improvement shall continue as long as those whose interests we strive to serve, shall accord to us the necessary measure of support. In accordance with the expressed desire of a large number of our readers, the form of the paper, commencing with the next number, will be changed, so as to make it more convenient for binding. Improvements in the character of the illustrations and in other particulars will be introduced, and will serve to greatly increase the attractiveness and value of the publication. Our staff of contributors to all departments is steadily increasing, as a glance over the present number will show, yet there is room in our pages for the opinions of any reader who may have anything of interest to communicate.

The announcement last month of our intention to publish shortly the "Canadian Contractor's Hand-Book," as a premium to new subscribers to the CANADIAN ARCHITECT AND BUILDER, has already added largely to our subscription lists, and we feel certain that during the coming year these lists will include the names of a huge majority of the contractors throughout the Dominion. It is the intention to print in the "Canadian Contractor's Hand-Book" a classified list of all business firms having advertising contracts with the CANADIAN ARCHITECT AND BUILDER for 1889. The value of such a permanent advertisement will be readily understood. Those of our advertisers whose contracts expire with the present year, or during the first three months of 1889, and who may desire to appear in the classified list in the "Hand-Book," should send us notice of renewal of their contracts at once.

To one and all our readers we wish a very Merry Christmas and Happy New Year.

IT would be interesting to know how the park area of the principal Canadian cities compares, in proportion to their population, with that of old world cities as given below: Paris, 172,000 acres: London, 22,000. Vienna, 8,000; Berlin, 5,000.

THE Builders' Associations of Canadian cities, are at present engaged in revising their forms of building contracts for the new year. It is fully time that a standard form of contract should be agreed upon for use throughout the Dominion. This is a matter that might profitably engage the attention of the proposed Association of Architects for the Province of Ontario.

WE regret that several glaring errors should have crept into the article by Mr. David B. Dick, published in our October number. The most flagrant of these occurs in the second paragraph, where, by the omission of a word in one place, and a whole line in another, the writer is apparently made to say that corrosion is caused in soil pipes by caulking the joints. Every precaution will be taken to guard against a repetition of such annoying mistakes in the future.

AN interesting letter from a Boston correspondent reached us too late for publication in this number. It will appear next month. In the January and February numbers will also appear a description of the New York Trade Schools, accompanied by illustrations showing the interior of the workshops and specimens of the pupils work. In view of the interest which technical education is at present exciting in Canada, it is hoped that these articles will prove interesting and valuable.

WE are pleased to notice the manifested desire on the part of the architects of several Ontario cities for an Architectural Association for this Province. The formation of local Associations such as that organized at Ottawa the other day, is a step in the direction of the larger object. The organization of a Provincial Association, and the establishment of a course of instruction in Architecture in connection with the School of Practical Science in this city, as proposed by the Minister of Education, would secure for the profession many advantages which, under the present unsatisfactory condition of affairs, it does not possess.

A CHATHAM, Ont., reader, in sending us his subscription to the CANADIAN ARCHITECT AND BUILDER, incidentally remarks that although the paper is not in all respects what he would wish it to be, he feels bound to encourage it. We have written our candid friend for suggestions regarding the manner in which the paper might be improved. We will be grateful for any suggestions in this direction from any reader, and for assistance given us in carrying out such of them as are considered of most value. We should not be expected to know the opinions and wants of all our readers, so if you do not get what you want, please ask for it.

A READER of this journal writing from Quebec regarding our comment upon the unbusinesslike method of keeping the record of new buildings in the city of Hamilton, says: "Please blow us up a little on this head. It will do us good to be reminded of our shortcomings." We take this to mean that in Quebec the same unsatisfactory state of affairs exists. We regret that it should be so, and would suggest that the new aldermanic brooms about to be elected make a clean sweep of building inspectors who fail to enforce compliance with the law requiring the obtaining of a permit for every new building before construction begins. Such permit should include the name of the owner of the proposed building, the location of building, the materials of which it is to be constructed, and the estimated cost.

IN this age of professional, trade and business organizations, it is somewhat singular that the master builders and contractors of this country have not in like manner associated themselves. The men in other callings have discovered that wrongs which individual effort could not remove, quickly yielded to the strength of combined effort. Is the condition of the master builder in Canada so prosperous and satisfactory as to make organization unnecessary? Numerous failures in their ranks during the past year, would seem to indicate that such is not the case. In the United States the National Association of Builders is, we believe, doing much to conserve the rights and improve the position of the master builder. It is but reasonable to suppose that like results would follow the formation of a Canadian Builders' and Contractors' Association. Let us have some opinions on the subject.

WE congratulate the City Engineer of Toronto upon the good judgment he has displayed in the nomination of assistants to perform the various duties of his Department. Mr. Chas. Rust has had a wide experience in sewer construction, has proved his ability and responsibility, and we doubt not, as assistant engineer in charge of sewers, he will discharge his duties in a manner satisfactory to the Chief of the Department and the citizens. Mr. Meadows, who is to have charge of the construction of roadways, has earned a creditable reputation in that particular field. Mr. Roden, during several years service as Secretary to the Board of Works, has shown himself a capable, painstaking and obliging official, and, relieved of the multitude of petty details belonging to his former position, will do the city good service as chief clerk of the Department. The appointment of Mr. A. H. Clarke to be Secretary of the Board of Works, is equally satisfactory. The Works Department, as thus re-organized, should hereafter perform its work in a highly efficient manner.

THE Solicitor for the city of Toronto, after looking carefully into the Statutes, is of opinion that the Ontario Legislature may grant authority to enable the City Council to compel the telephone and electric light companies to place their wires underground. In the case of telegraph companies whose lines extend beyond the bounds of the Province of Ontario, his opinion is that such authority must come from the Dominion Parliament. The Solicitor suggests that the opinion of emi-

nent counsel should be obtained as to the correctness of his interpretation of the Statutes. The decision of this question is of great importance to every city in Canada, in most of which the planting of unsightly poles and stringing of a net work of wires has not only proved to be a nuisance, but dangerous to life and property. We hope that no time will be lost in obtaining from the proper quarter the necessary legislation. In Toronto, an effort should be made to have the change effected before new pavements are put down on the leading business thoroughfares, thereby avoiding the necessity of tearing them up again.

A GREAT deal of false economy has been practised in Toronto in the matter of putting down cheap pavements. It is satisfactory to note that the citizens appear to be tiring of experiments in this direction, and show a disposition to adopt something more costly and substantial for the future. A gentleman who spent the greater part of last summer in Europe, informed the writer that asphalt pavement, such as has been put down on Bay street in this city, and on St. James street, Montreal, is largely in use on the streets of old-world cities, and has given the best satisfaction. Of course, considering the difference in climate, it does not follow that a pavement which proves successful in London, for instance, will give like satisfaction here, but there is reason to believe that where asphalt is properly laid, it makes an excellent and durable pavement. We trust that before many years shall have elapsed, the character of the pavements on the principal business thoroughfares of this city will be so improved as to avoid the necessity of constant patching and enormous expenditure for repairs, and make it possible to keep the streets in a cleanly condition.

THERE is no person who should regard with greater satisfaction, the reorganization on a business-like footing of the City Engineer's Department of this city, than Mr. Sproatt himself. Up to the present, that gentleman has not been given full control of his department, but has been expected to defer to the opinions and wishes of aldermen composing the Board of Works. The result has been, that when mistakes have occurred, the aldermen who persisted in having a hand in the management of affairs, shifted the whole responsibility upon the Chief Engineer for errors which probably would not have happened had the latter relied entirely upon his own judgment. The Mayor takes the right view of the matter by insisting that under the new order of things which just about to be established, the City Engineer shall have entire control of his department, with the power to nominate and discharge his subordinates, and that when this power is given him, he shall be held responsible for the proper conduct of his department. This is the method which obtains, and has proved to be satisfactory, in large private business concerns, and we have not the least doubt that it will work equally well in the public service.

A DISCUSSION, commenced in Australia and New Zealand, is being continued in the United States, relative to the advisability of changing the system under which all the public buildings of a nation are designed by one architect employed for that purpose by the Government. The opinion seems to prevail that if the designs for public buildings were put up to competition among the architects of the nation, a greater variety of designs, and designs which would be fairly representative of the architectural talent of the country, would be secured. Such a system would certainly give encouragement and stimulus to the study of architecture. We are inclined to doubt, however, whether a system of architectural competitions for public buildings would result to the profit or elevation of the architectural profession. It would open the door for the methods of the politician to creep in, and it is to be feared that those who would condescend to practice those methods, would get most of the prizes. If some equitable plan could be hit upon of allowing the architects of the country to share in the honor and profit of designing our public buildings, the results would no doubt be much more satisfactory than at present from every point of view. We should like to hear the opinions of architects on the subject.

THE step taken by the Toronto Board of Works in deciding that henceforth sewers upwards of 12 inches in diameter shall be constructed of brick, must be regarded as a retrograde one. The fact that the City Engineer protested against the proposed change, seems to have had but little or no effect upon the minds of the aldermen. There are several particulars in which a good pipe sewer is superior to a brick sewer. One of the most important is, that being salt glazed, it is much smoother inside than a brick sewer with its many joints can possibly be, and consequently will not so easily fill up with sewage deposit. This is especially true where the street grade is but slight. It is a well-known fact that in certain kinds of soil it is next to impossible to put down a well-constructed single ring brick sewer. The opening up for repairs of some of the brick sewers constructed years ago in this city, has revealed the presence in them of large deposits of sewage matter. There is every probability that much of this deleterious matter finds its way through the pores and broken joints of the brick into the ground, and proves a source of danger to the public health. In addition to the disadvantages mentioned, there is the further important consideration, that a brick sewer, as shown by contractors' tenders, costs from ten to fifteen per cent. more than a pipe sewer. The action of the Board of Works in this matter strongly emphasizes the need for a change in the system under which the opinion of the City Engineer may be overridden by that of aldermen possessing little or no knowledge of construction.

PRACTICAL HINTS TO CARPENTERS.

BY OWEN B. MAGINNIS.

ONE of the most important and too often neglected things, in setting jambs, is to block behind the jambs for the screws of the hinges. In rebated jambs this blocking is indispensable; so measure down about 6 inches from the head and 9 inches from the floor, and nail in a 4 inch pine block on the stud, behind the jambs, to secure the screws. Builders should watch sub-contractors in this small matter, as the screws pull out, when they have no thickness to hold to.

If the casing have a beaded or molded edge without corner blocks, the top corners should be mitred with a mitre jack made in the following simple manner:—Take a piece of 1¼ inch stuff an 1 inch or so wider than the width of the casing, about 2 feet 6 inches long, nail a *fence* or piece of ⅞ inch strip on both edges, rising above the surface the thickness of the casing. Now take a bevel, set it exactly, *not nearly*, but exactly, to an angle of 45°, or from 3 to 5 inches on the steel square, (reverse the bevel to see if the angle be true) and mark two reverse mitres across the edges of the ⅞ strips and the surface of the bottom or wide piece and over one edge,—the edge which has the short corners of the bevels. Saw deep enough into the wide piece on this marked edge, to cut through the bead or moulding on the casing when it is placed between the fences against the one which is sawn into. After putting the casing in its place and marking the top corner with a knife, the casing is placed against the fence with the mark exactly at the saw cut, and having the saw outside the mark, so as to slightly leave it on the stuff—the mitre can be readily and instantly sawn without using a bevel or a templace, which are inaccurate and unmechanical. The bottom end must fit tightly down on the upper end of the case block; if not, then the end must be scribed to the block with the compasses before mitreing.

All casings ought to be level across the face, so that when a straight-edge is placed across the opening, it will touch all their surfaces. The head should also be straight with the stiles, and all the mitres and joints tight and well nailed. All mouldings and back bands can be mitred and nailed on when the above is done, and the mitres will come tight.

In setting back window jambs, or on those window frames which have outside blinds with a panel back below the sill, the following is the best way to proceed: First, cut with a chisel on a straight line, the groove (where it stops against the sides) out of the frame casing, both top and bottom, on both right and left casing, and clean all the mortar and dirt out of the plowing. Now take the short rebated jamb for the head, and getting upon a high horse, place it with its rebated tongue on the head groove, and mark exactly, with a sharp knife, the inside corner on the left and right hand groove. Square these marks over the face and lay out a dado ⅜ wide towards each end. Dado this laying out ⅜ deep. Next take the right and left jamb and square one end of each in pairs. Lay out a tongue ⅜ wide from these square ends and ⅜ thick, guaged from the faces. Cut these tongues out and run a rebate—plane shaving of the back side of the tongues of the head jamb and sides, and take an arris of the face side. This will let the tongue go easily into the grooves in the frame. Next, nail the head on the sides, keeping the front edges flush, and break off the over length of tongue on the head piece. Set the tongues of the jambs in the frame grooves, and drive the jambs in till they sound solid. Use a block, so as not to bruise the edge in driving. When they are in solid, mark the groove at the sill, and see if the jambs are not too wide for the plaster; if they are, the overwood must be sawn or planed off until they come flush with the plaster. Take the jambs down when this is done, and lay out a ⅜ dado from the groove mark. This dado is to receive the foot-head. Then take the foot-head, cut it to the length of the dados of the head, and allow ⅜ for a tongue on each end. Work these tongues on ⅜ deep, and nip the foot-head to the width of the jambs. Ease the tongue as well as the jambs, and nail the head side and foot-head together afterwards, set them up in their place, and when they are driven home, toe-nail them into the casing.

It is reported that the massive blocks of stone required for the Canadian canal at Sault Ste. Marie, will be taken from the Owen Sound quarries.

The extensive stove and furnace manufacturing establishment of the McLary Mfg. Co., at London, Ont., was almost totally destroyed by fire a fortnight ago, involving a loss of $100,000. We understand that arrangements have been made to re-build at once. In the meantime, order is being speedily evolved out of chaos, and owing to the large stocks on hand at its branch establishments the Company is enabled to fill orders as usual.

WHAT IS TRUE ARCHITECTURE?

BY R. W. GAMBIER-BOUSFIELD,

ASSOCIATE OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

PROFESSOR Roger Smith, in a recent lecture to students at the University College, London, remarked: "Remember, then, that it is a great mistake to attempt to use in designing what you do not understand," and he further says that it is not necessary to go far to see endless examples of this mistake, made by professing architects of to-day. If "architects," so called, would but take this to heart, there would be better examples of our art rising every day in our streets. Particularly is the advice of this genial professor to be taken to heart by students and draughtsmen, to encourage them to look carefully into the use and meaning, as exemplified in ancient buildings, of every feature and detail they would imitate or use as a base for their design. The Romans fell into this mistake nearly 2,000 years ago. They were fond of the pillar, but forgot its use, and introduced them as "useless additions without even a pretence of utility." The Roman order consisted, not of column and entablature, but of an arrangement of pillars placed at a distance apart, bearing a very heavy cornice which, in consequence of the distance of the pillars from one another, had to be supported in the centre by an arch springing from piers. The columns were raised on pedestals, and placed in front of the piers. So the pillars formed no part of the construction; the cornice was supported quite sufficiently by the wall. The Roman was a debased style, and not true art. But the question constantly arising in the mind of the student is, "What is real or true architecture?" The simplest definition is that of the elder Pryn, who says, that it is "ornamental or ornamented construction, *not* constructed ornament." The Roman order is an example of this "constructed ornament," in which this style differs materially from earlier and also later styles of architecture. Directly ornament is constructed—that is to say, when simply for the purpose of ornamenting a building, ornament is applied without aim or use, and you go out of the way to construct it, you go wrong, and your work is not true architecture. Our buildings may be constructed with ornament, but the ornament must be part and parcel of the whole design, and must not be piled on without regard to the use and object of the part ornamented. A pillar should not be used unless it has something to support, and that something not a mere ornamental cornice or band, but a useful lintel or impost of an arch, or a parapet wall, or something of similar character.

There is no example to be found among the Greeks, nor indeed is there in the ruder architecture of the Persians, Chaldeans and Egyptians, anything approaching "constructed ornament," although some of their work is very highly ornamented; neither is there in the later Italian, or the round or pointed Gothic. From the time that the debased Roman died out, until the time when the "imitative styles" began to be employed, we find no example of it. The Egyptian, who seldom used the arch, never did so for ornament. The Assyrians never used a buttress without giving it real duty to perform, and the Persians and Greeks always used their pillars constructively, however highly they ornamented them. So in Gothic times—the arch, the flying buttress, the pinnacle, all features adding greatly to effect, have in every instance a use and a work to do that cannot be done so well by any other means. They are ornamental construction, not constructed ornament.

What tremendously costly works are the buttresses to be seen outside every Gothic cathedral, piled up tier on tier, with flying buttresses resting on them, it may be two or even three at different levels. Nor does the buttress end when it has given an abutment to the highest flyer, but towers above and terminates in a lofty pinnacle far above the eaves of the roof or parapet wall. One might as a casual observer say, this was constructed ornament with a vengeance, and therefore, false art; where is the use of it all? But there is a deep principle, implying marvellous skill and great mechanical knowledge at work here, for the weight of the pinnacle, counterbalancing the thrust of the roof along the flying buttress, obviates the necessity of a far more cumbrous buttress, which *would* be necessary if it were not for the pinnacle, to ensure the stability of the structure. True art admits of making the buttress ornamental, though it utterly condemns the use of the buttress where no buttress is required. It is the same with the beautiful canopies of stone, supported sometimes by solid masonry, pierced only by a narrow light, at others by the slightest of shafts, sometimes forming a head to a window, at others without any apparent object, that stand at the bases or many spires. Their work is to counterbalance by their weight the outward thrust of the sloping sides of the spire.

As another example, take the clustered shafts supporting the nave arches of a XIII century cathedral. How slight and delicate they are, especially when compared with the heavy Norman columns, or the massive Italian piers, or early French abutments. The slender, lofty shaft, rising almost uninterruptedly from the base near the ground to the spring of the stone vaulted ceiling, bearing its portion of the load above, obtaining its lateral support from the wall against which it stands and to which it is here and there attached—those marvellous pendants from the fan-vaulting of the XV century, of which a well known example is in the roof of Henry VII's chapel at Westminster, constructed with such extraordinary ingenuity—are not mere ornamental "drops," but perform a very serious and important duty, forming actual abutments to the downward curved surfaces of the fan-vaulting from which they actually hang. Such construction is a marvel now, even though we have the detail of every stone employed; much more was it a mystery in years when the knowledge of the art had first died out, which it soon did, under the influence of the Reformation. These hanging masses of stone looked very threatening over the heads of the devout worshippers, no doubt, but they have hung for over 350 years, and except an earthquake rend the vault, they cannot fall. Sir Christopher Wren, the great apostle of the imitative styles, when asked about them, shook his head, as at a problem far too deep for him to solve, and replied to his querist: "If you will tell me how they are constructed, I will go and do likewise." The key to the answer must be found in their use and object. Sir Christopher Wren could not comprehend this, and therefore he was not ashamed to say he knew nothing about them. Understanding what duty they perform, it is not a difficult matter to get at their construction. And thus it is, with every feature, and it behooves us as the expounders to the rest of the world of the art of Architecture, to look into these matters, and if we profess to be architects, to act accordingly.

Students and draughtsmen must beware of the easily acquired, but none the less barbarous habit, of introducing details and features they do not comprehend. If a man wishes to be ever anything but a mere copyist, he must apply himself to this study. It will repay him well, and give him a great interest in his work, such as he perhaps never dreamt of before, and his ultimate designs will be free from the insipid, childish details, stuck on without rhyme or reason, that are to be met with side by side with the works of men who know what they are doing. Some men call themselves architects, that is, expounders and practisers of the art of Architecture, when they do not know the A B C of the art.

UNFAIR PRACTICE.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—I want to call your attention to a piece of very unfair practice on the part of some men practising as architects. "Architects," so called, appear to forget that it is their duty to stand between the proprietor and the contractor and see that the one is fairly dealt with by the other. I find it is the custom of some men not well up in estimating their designs, to ask builders to tender as if the work had been definitely ordered by the client. The builder spends valuable time and trouble on preparing a tender, believing the work to be going on if tenders are satisfactory, not knowing that the chances are that nothing further will be done, that is to say, that the client has not yet made up his mind that he will proceed with the work because he has not had an estimate of the cost. An architect has no right to treat contractors so. He should be able to prepare himself a good estimate of the cost, and then, if the amount meets with the client's approval, to obtain tenders on the understanding that the works are to proceed if the tenders are satisfactory. My attention was called to this method of procedure by a client of mine informing me he had found it the custom with some "architects" he had employed, and told me he would not trust any architect's estimate unless based on actual tenders. He expected me to prepare working drawings, details, rough) and specifications, get contractors to tender and let him know the result, all on the chance of its coming within a figure he had in his mind. He said he had had a great deal to do with building, and this was the invariable way he had proceeded. I remonstrated with him in vain, and told him flatly no architect would do such a thing. The result was, he took the whole matter out of my hands, and, I dare say, went back to his "architects" so called. My blessing went with him. Those kind of men are not the clients for architects proper.

Yours truly,

"AN ARCHITECT."

MASONRY AND STONE CUTTING.

BY JOHN A. PEARSON.

A VERY interesting and instructive address on the above subject was given before the members of the Toronto Architectural Draughtsmen's Association, Nov. 20th, by Mr. John A. Pearson, recently from England, now of this city. The subject was introduced with a few useful hints to be observed in the preparation of foundations to receive footings, and the best methods of laying drain pipes, the points to be observed and avoided, the composition of mortars and cements, and the best manner of testing their respective qualities.

FOUNDATION WALLS.—In laying footing courses, the broadest bed should be placed down. When a large quantity is required, there is sometimes a difficulty experienced in obtaining them all of an equal thickness. They generally run off from the six inches specified, to three or four inches, and if the architect is not watchful, the waney side is placed against the bank and packed up level with a spall, and the full six inches thick exposed to view. In foundation walls, there is always a tendency to make the inner face strongest, for the reason that it is the line face, and always exposed. The mason sets up his inner face first, thus securing the first place on the wall, and naturally selects the best stone to make a presentable face (especially if it is to be pointed for lime whiting). The bank side is next walled with the stones that have been picked over, and, in some cases, knocked off to suit the tailers of the inner face. Less care and time is thus expended on the bank side. Wallers are never constantly in the employ of one builder; as soon as the foundations are in they are stopped, and must seek employment elsewhere. Being so migratory, they are not over scrupulous, and it cannot be expected they would place the good stone against bank, and the waney footing exposed, to be condemned by the architect, who is always satisfied with a strong looking job.

The reveals to door and window openings are generally allowed to be built in brick to save labor cutting, the brick tied into the rubble, and the lintel thrown across, which has a bearing never more than nine inches—the whole thus forming a kind of loose case. This is not desirable if it is to be built in brick; the rubble should run through every four or five courses to tie the work, not the brick, for 6½ inches is as long a tie as can be obtained in brick work. The rubble which forms the body of the wall should form the tie.

After minutely describing the different kinds of wall stones and walling, particularly sneck walling (so often aimed at but seldom attained), which depended chiefly upon the setting up of the lades, and the arrangement of the stones in the wall, the speaker went on to say:—Wallers should always work opposite to each other. Never allow one man to build a wall alone. Walling is different to brick work, it being possible to raise only one face to the height of the "lade" (which should never be more than 15 inches) at a time, the stones must necessarily become narrower on the bed, whereas, if two were employed, they could overlap or tie on to each other's work, in the height of the line. A foolish mistake with some architects is to insist upon the stone being squared back full five or six inches on the joint. Three or four inches is ample, the stone then tapering off, enabling the opposite stone to indent with it, and the fillers being placed diagonally or straight across. All wall stones should be placed on their natural bed; if reversed they will drink the water more freely. Guard against walling in "bleeders," the presence of the iron in them is generally detected by a blue, yellow or purple tint in different kinds of stone. Turning the stone so that the bed forms the face, should be condemned.

In ogee or circular walls, after the first two courses have been set to the trammel or template, pegs are driven in 2 ft. 6 in. or 3 ft. apart, to project sufficiently to clear the rock for plumbing, and from these points the "lades" are set up and walled in between. Where sills occur, they should be set on "throughs" and ties thrown immediately across door and window heads. All walls should be weather pointed, not jointed, for in jointing, on either side of the impress of the tool is left a narrow band of mortar untouched by the steel, left raw and porous, which absorbs the water freely.

TESTING THE WORK.—If there is any doubt as to the fillers being properly bedded, pull out here and there in the wall, and hold a lighted candle in the aperture. If dry, the flame will be disturbed by the current of air which will play inside the wall. Take a flexible cane, and walk over the work; if the stones rise under the feet, you may be sure they are not properly bedded, and by forcing the cane down into the wall in different places, you can gain a fair idea as to the number of throughs.

STONE CUTTING.—After describing the numerous tools and uses of same employed in stone cutting, a description was given of rock, punched, rowed, inch-tooled, scutched, bush hammered, boasted, tooled, and cleansed faces, and the method by which a mason would bring a stone to a plane surface—the sinking, squaring back, and trammelling required in running moulded work in arch stones, and how arch stones were often worked slack to the square on the joints. The different throats, water joints, dowelling, joggles for coping, projecting string courses, cornices and arch stones were fully explained; also what "banker marks" were, which, in very old buildings, were cut on the face of the stone, and by the comparison of which the date of different buildings could be arrived at. The speaker pointed out the way to detect the bed of a stone, and the presence of "drys," explained the way in which stones were "lewised" to be raised, and the setting of ashlar and moulded work, and concluded by exposing a few of the frauds that are practised in the trade in worked stone, where to look for such, and the best way to detect them.

A STUDENT'S REPLY TO "ABACUS."

EDITOR CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—After reading "Notes of a Trip to the West" in the last number of the CANADIAN ARCHITECT AND BUILDER, I was much disappointed, as I could see in them no information of a practical kind, nor anything but a wholesale condemnation, on the one hand, of architecture as seen in Chicago and the States, and on the other, about as general a compliment for Toronto architecture, all in such sweeping terms as to make one doubt if any part of the article referred to is entitled to any consideration whatever.

As a student, I feel the need of help to make proper comparisons and to form correct opinions as to the merits of different works, but it certainly will not tend to my improvement if I am satisfied to stop with the conclusion that this or that is good because I like it, and that another is bad because it is not satisfactory to me, without attempting to go into some analysis to establish a reason for my opinion.

I have many times wished that in such articles as the one mentioned, by "Abacus," we might find more definiteness. If a piece of architecture is condemned, the reason might be shown in detail, even introducing some sketching, if necessary, in order to show what would remedy the fault found and make the work good instead of bad.

I am willing to agree with "Abacus" that there are many vulgar, inartistic and ridiculous examples of architectural failures in Chicago, and also that there are many buildings in Toronto worthy of admiration, study and pride, but in all fairness, is not the reverse of this equally true?

Some parts of "Abacus'" notes strike me as being somewhat inconsistent, and other parts so extravagant in language as to be ridiculous. He says of the house by Richardson, on Prairie Avenue: "It is the most artistic house which we have yet had the pleasure of seeing—it is dignified, quiet, unobtrusive, yet refined and homelike. Unless the *plan* of this house was *known* to the beholder, he would be inclined to look upon it as retiring and gloomy in the extreme." So in the case of "this most artistic house," whether a beholder would regard it as "refined and homelike," or "retiring and gloomy in the extreme," would depend on whether or not he "knew the plan." On this ground, perhaps, if "Abacus" had "known the plans" of all the other houses, some might have found more favor in his judgment.

I should like to notice some of the public buildings both in Chicago and Toronto which are mentioned by "Abacus," but do not wish to trespass too much on your valuable space. If, with all the architects in Chicago, and the immense amount of expenditure under their direction, the sum total of their productions is, as stated by "Abacus," "a few, indeed, of artistic houses,' one wholesale store building "artistically worth more than all its other buildings," and churches, "the best of which have so much that is bad about them, that one cannot speak even a single word in praise," where, oh, where, is the encouragement to study, with a hope of producing anything artistic enough to earn the good opinion of such critics as "Abacus."

Would it not be more valuable to both architects and students to have an analysis or criticism of one or a few examples, with reasons for conclusions drawn, and suggestions of remedies for defects?

Give us something more definite.

STUDENT.

OUR ILLUSTRATIONS.

RESIDENCE FOR GEO. G. BOOTH, ESQ., DETROIT, MICH.—MASON & RICE, ARCHITECTS.

THIS house is situated on Trumbull Ave., and is constructed of stone and red brick. The front and side bay windows are entirely of bronze, with richly wrought frames of the same metal. The roof is of red slate, with ridge of copper. The entrance is of red stone, beautifully carved. The owner is Mr. Geo. G. Booth, manager of the Detroit *Evening News*, formerly President of the Barnum Wire and Iron Works, Windsor, Ont. Messrs. Mason & Rice, Detroit, are the architects.

RESIDENCE FOR DR. J. E. GRAHAM, TORONTO.—E. J. LENNOX, ARCHITECT.

The frontage of this residence is 25 feet, and the depth 65 feet. The plinth and sills are of Credit Valley stone. The pillars, frieze and dormer, are of terra cotta. The roof is covered with red tiles and red slate. The cornice and conductors are of copper. The entrance steps are built of Credit Valley stone and brick. The cost of this residence was about $8,000.

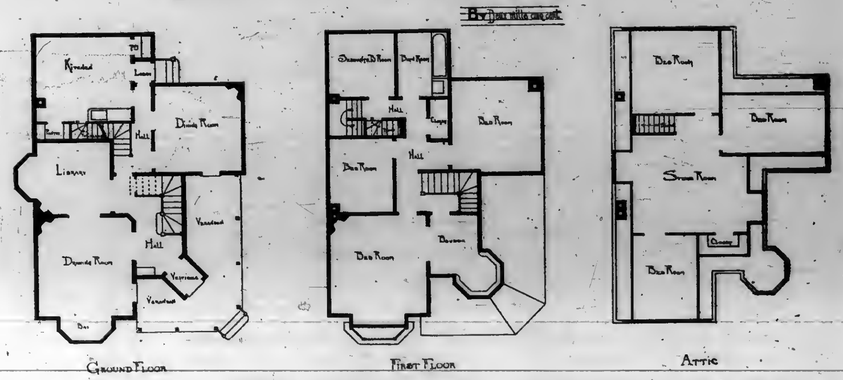
South Elevation

East Elevation

West Elevation.

Scale Feet

DESIGN FOR A $2500 HOUSE



Ground Floor

First Floor

Attic

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A $2,500 TOWN HOUSE—DESIGN BY "DEUX MILLE CINQ CENT."

This design is not an easy one to criticize. It is in some respects a good plan, and yet very deficient. The ining room cannot be gained except through the back hall, and even then, one must pass under the main staircase. There is no serving pantry to the dining room. The kitchen is of good size, but there is an overabundance of doors and windows, thus reducing the available space. The kitchen entrance is well arranged, and the passage to the main hall is very good, but not worth the loss of room. It may be good planning to place the fire places in the angles of the rooms, but there is such a thing as having too many of them. The dining room fire-place should have been in the centre of the north wall space. The dining room is well placed, but requires space devoted to passage to make it the proper size. The library we do not like, as it is on the west side, and the bay window would make it very cold in winter. A library or sitting room should have a south or east exposure. The hall is unnecessarily narrow and crowded; the outside wall could have been two feet east of its present position, without increasing the cos of the house, except for floors and roof. The vestibule is not satisfactory, and has three exposed sides. The verandah is well placed, and would be serviceable. The bedroom floor plan is very good. The bath-room fixtures should be arranged to allow of a window to the east, and not to the north. The attic plan is weak, in that all the bedrooms are made to open out of a storeroom. The elevations are fairly good, with the exception of the awkward roofing of the main hall projection.

"CANADIAN ARCHITECT AND BUILDER" PRIZE COMPETITION.

A NUMBER of very creditable designs for a new heading for this journal have been received in response to the competition announced in our October issue. As none of the designs are entirely satisfactory in every particular, it has been decided to divide the prize of $15.00 between the authors of the two which come the nearest to fulfilling the requirements. The selected designs, in the order of merit, are by "JOHN" (L. Fleming Taylor, Ottawa, Ont.), and "Manipulator," (Ernest Wilby, Toronto). To the first named author $10 is awarded, and to the second, $5.

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

OWEN SOUND.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

DR. G. S. PATERSON, is building a four story brick hotel on the site of the old frame "City Hotel," Poulett street. The new building will have a frontage of 104 ft. by a depth of 54 ft., and two wings at the rear, each 25 ft. x 73 ft., two stories high. A passenger elevator will run to the top story from the office hall on ground floor. The building will be heated by steam, will have electric bells to all rooms, and will be otherwise fitted out with all modern conveniences. The building when completed will cost about $16,000. Contracts let as follows:—R. Mallow, masonry, brick and cut stone, $4,600; Chas. Gordon, carpenter work, $4,950; R. P. Butchart & Bro., plumbing and galvanized iron work, roofing, gas piping and steam heating, $2,875; W. McClelland, plastering and plastering, $1,775; Alex. Hill, painting and glazing, $600.

The widening of the harbor is to be proceeded with at once. The west bank of the river will be dredged awny for a distance of 2,500 ft., and averaging about 200 ft. from present water line back, taking away several buildings, including Lemon's pottery and Griffith's tannery. Total cost of the work will be in the neighborhood of $60,000.

The new steel steamer being built for the C. P. R., at the Polson ship-yard, is fast being brought to completion, as far as the hull is concerned. The Polson works have also got the contract for the cabin work.

INFORMATION WANTED.

CITY HALL, QUEBEC, NOV. 26th, 1888.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—Can any of your readers inform me how a four feet square drawing, or other board, can be made say from ⅛ to 1 inch thick, which will not warp? It must be of some kind of soft wood, as pine, basswood, butternut, in which brass tacks may be driven representative of the relative position of the city electric lights, whereon, by not quite homing the little nails, all the electric circuits wires, single or double, may be represented by delicate wires or twine of different colours, by threading along and around the projecting heads of the nails or pins. I am thus explanatory, that other cities may avail themselves of the idea of so representing their streets, lights, and circuits on printed or lithographed copy of their respective city maps, mounted on blocks as aforesaid.

The question is, how can the board be made so as not to warp, and thus throw the plan into kinks and wrinkles? Will two ¼ or ⅜ inch thicknesses laid crossways of each other and glued together, answer the purpose? Would it suit to lay the boards alternately with the grain in opposite directions? or what other mode can be adopted to prevent warping, or get the board out of winding, than that of screwing or fixing it to a wall or partition, which prevents it from being easily removed therefrom and put on a table when required for alterations, additions or extensions. A solution will oblige.

Yours truly,

C. BAILLARGE,
City Engineer, Quebec.

[Referred to our readers.]

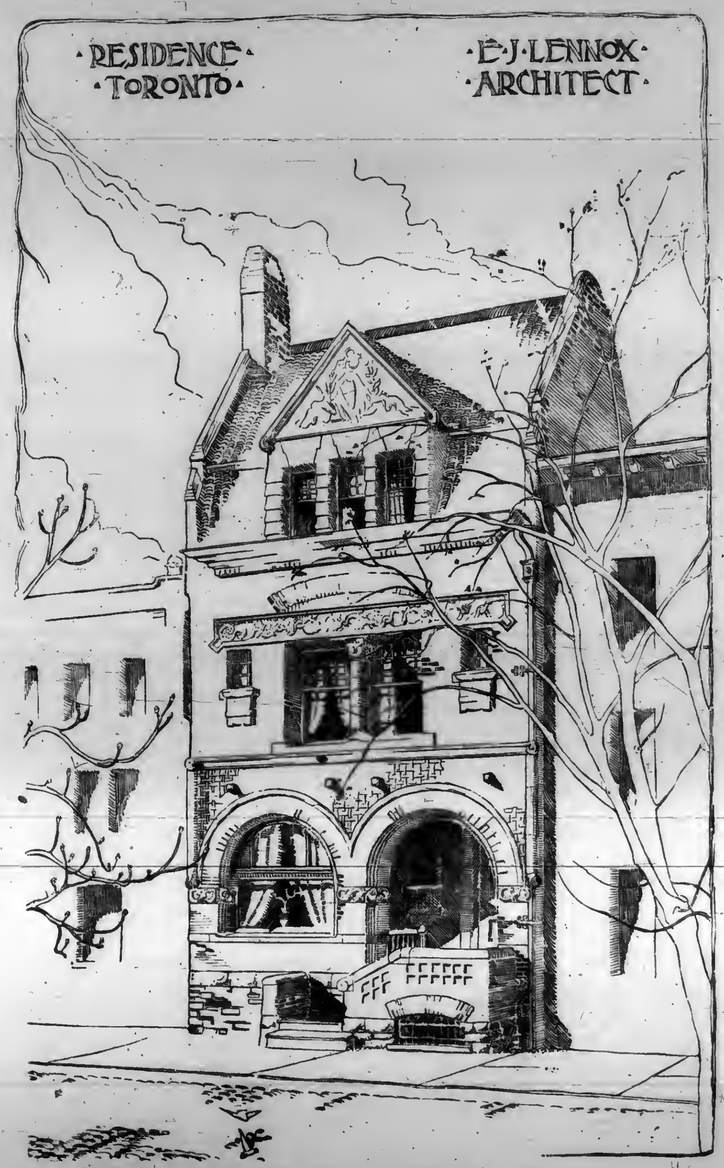
QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

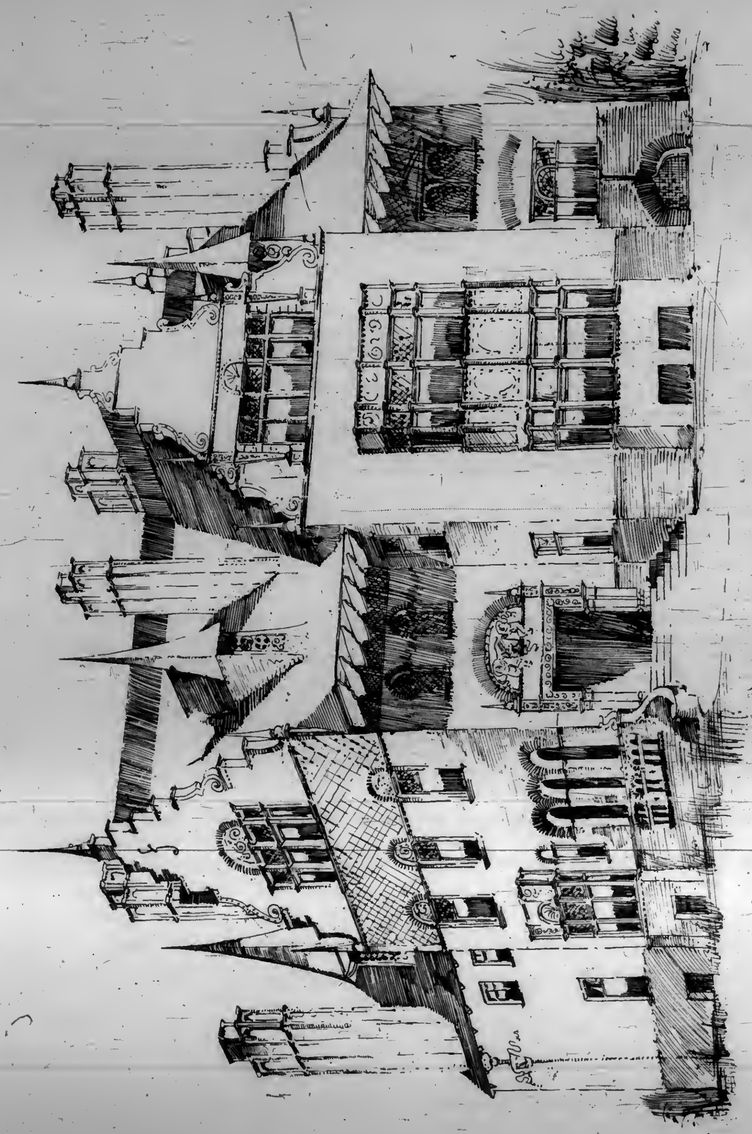
CORRECTIONS in last month's report: The cost of Dr Casgrain's house should read, $6,000, instead of $600; the weight of S. Matthew's Church bells should be 6,000 lbs, instead of 600 lbs, and that of the Cathedral bells 8,000, instead of 800; the words "unfrequent erection" should read "unfrequent event," (used in connection with the hanging of S. Matthew's bells).

The site of the present skating rink being required by the Government to complete the open area in front of the new parliament buildings, arrangements have been concluded whereby the skating club undertake to demolish and remove the present rink next April. It is to be rebuilt on the opposite side of Grande Allee, on a modified plan, using the present timber arches to span the ice-

VOL. I.] The Canadian Architect and Builder. [No. XII.



RESIDENCE FOR DR. J. E. GRAHAM, TORONTO.



RESIDENCE ON TRUMBULL AVE., DETROIT, MICH., FOR GEO. G. BOOTH, Esq.
MASON & RICE, ARCHITECTS, DETROIT.

space and platforms as at present. In other respects the building will differ materially from the present one; one new feature being the erection of a bowling alley in connection with the rink. The same ice space will be maintained, that is, 176x72 feet. Provision has been made for dressing rooms, secretary's office, caretaker's apartments, accommodation being also secured for the various snow shoe clubs, including a large supper room, with windows overlooking the ice. The contract has been let to Mr. George Boiteau for about $11,000. The work is in charge of Mr. H. Staveley, architect.

Mr. Valliere, furniture manufacturer, is having a handsome stone dwelling erected on St. Augustin street, for occupation next May. Mr. Edward Cote is the contractor; Mr. J. F. Peachy, architect.

The St. Patrick's Literary Institute, whose hall on St. Anne street was almost entirely destroyed by fire last February, have entered into a contract with Charles A. O'Leary to rebuild it at a cost of about $6,000. The hall will have a seating capacity of about 800. It will be furnished in an inexpensive manner, but will form a neat, cosy room for lectures, society meetings, etc. Mr. H. Staveley, architect.

OTTAWA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

A clear open winter up to the present time has been a blessing to the builders of this city. As there has been no snow yet, contractors have been enabled to continue outside operations, and a few weeks more of the present weather will see buildings now under way properly enclosed for the winter.

The building by-law referred to in my last, has been before the city council, and as only ten clauses have been disposed of, it will take several meetings to complete it. The general impression is, that if not knocked in the head altogether, it will be considerably modified, as the majority of the aldermen consider the by-law in its present form too stringent for the city at the present time, and that it would materially interfere with building operations. Until the by-law is adopted and an inspector appointed, it will be impossible to keep a correct record of building operations.

A preliminary meeting was held on Saturday, the 1st inst., at the office of Mr. G. F. Stalker, of those interested in the formation of an Architectural Association for Ottawa. The matter had been talked of for some time, and the necessity for the existence of such a society was generally recognized. At the meeting on Saturday, a general discussion took place on the situation, which had the effect of clearing the ground, and a few resolutions were adopted upon which it was hoped an Architectural Institute for Ottawa would be established. An adjourned meeting was called for Wednesday afternoon, the 5th inst., at W. Arnoldi's office, which was well attended. The resolutions adopted at the preliminary meeting were sustained and signed by all present. An Architectural Institute for Ottawa was formed, and a committee appointed to draw up by-laws, and submit the same at a future meeting of the Institute. The officers of the Institute will then be appointed, and the by-laws finally considered and adopted, with such changes as may be found necessary. In the meantime, Mr. G. F. Stalker has been appointed Secretary *pro tem.* It is to be hoped that the architects of other cities will follow this example, and before many months a convention of Ontario architects will be called with the object of forming an Ontario Association. Judging from the great benefits derived by the members of the American Association, I would imagine that the Ontario architects would be unanimous on this point.

The many friends of Chief Government Architect Fuller will be pleased to hear that he is improving rapidly, but will not be able to assume his duties for several weeks.

Very little building operations are spoken of for next year. It is supposed they will fall far short of this year, as this has been an exceptional season.

OTTAWA, ONT.—Following is a report of the building operation for 1888.—Architect F. J. Alexander reports: Union Bank building, cost $20,000; 6 residences, total cost $27,800; school house in Stewarttown, cost $1,000; school house in Hintonburgh, cost $4,500. Architect G. F. Stalker reports: 3 brick stores, cost $14,000; 5 residences, total cost $11,500; organ gallery, Dominion Methodist Church, $1,000. Architect James R. Bowes reports: 4 separate schools, total cost, $24,100; central police station, cost $14,000; Congregational Church, cost $10,500; tenements, total cost, $13,500; 2 brick residences, total cost, $7,700; addition to Harris & Campbell's factory, cost $5,000; 9 brick cottages, cost $26,000; interior improvements to St. Patrick's Church, cost $3,500; Rideau skating and curling rink, cost $10,600; St. Bridget's Church, $75,000; R. C. Church, Jateville, cost $3,000; Church at Vinton, $14,000. Architect James Mather reports: Y. M. C. A. building, cost $18,000; British American Bank Note building, cost $30,000; Presbyterian Church, cost $6,000; 2 brick residences, total cost, $15,000; 5 stores, cost $8,000. General—9 private residences, total cost, $45,600; stores, total cost $29,000; Orange Hall, cost $7,000; Government Printing Bureau, cost $100,000; tenements, $14,600; German Lutheran Church, cost $12,000.

It would be safe to estimate the value of other buildings not included in the above at $50,000. Not a bad showing for Ottawa for 1888.

The Government has expended a large amount of money paving Wellington st. in front of the Parliament Buildings, and a great deal of work has been done on the new Departmental Building. The building has been roofed the past season, and the interior work is now being done. When completed, it will cost $750,000, and is considered to be the most prepossessing and substantial building in the Dominion, and a lasting monument to Chief Architect Fuller.

Every contractor should have a copy of "The Canadian Contractor's Hand-Book," to be published shortly. Send $2 for the book and the "Canadian Architect and Builder" for a year.

BROCKVILLE.

BROCKVILLE, Nov. 21st, 1888.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—I have been in receipt of the last five numbers of your publication, and must say that I am well pleased with same, and trust that you will receive the hearty support of every architect and person interested in building in Canada, so that you may be enabled to steadily improve the standing of your journal, that it may stand at the head of all such publications in the near future. I see in the columns of your last issue, several references made by your contributors to the importance of forming an Architectural Association in Canada, and regret that the Toronto architects, who should take the lead in all such matters, do not make some decisive move in that direction and form an Association at once, so that they may be able to hold several meetings during the winter months, and have the Association placed on a firm footing.

Building operations have not been very brisk this season, though several important buildings are now in the course of erection, from which I select the following as being the most important: Addition to the Leeds and Grenville County Court House, Crain & Mix, contractors, probable cost $22,000, Geo. A. Allan, architect. Fulford building, a large four story building divided into stores and offices and containing the store and work rooms of Messrs. Fulford & Co., constructed of lime-stone with brown Credit Valley free-stone dressings. This building is being erected by day work under the able supervision of John Mix; probable cost $18,500; Geo. A. Allan, architect. Brockville High School, a two story building constructed of lime stone with Scotch sand stone dressing, heated and ventilated by Messrs. Smead & Dowd's system, Messrs. Logan, Price & Hagerty, contractors, probable cost $16,000; John McMullen, building superintendent. Galena building, a three story brick building containing stores, billiard saloon and dwellings, probable cost $6,500; O. E. Liston, architect. Masonic Hall, owned by Thomas Tompkins, a large three story building containing stores, offices and Masonic lodge rooms, constructed of brown Credit Valley free stone and Scotch sand stone, is being built by the day under Wm. Tompkins, foreman, probable cost $18,000; Geo. A. Allan, architect. General Hospital, a two story brick building, heated and ventilated by the Smead & Dowd system; John D. Warwick, contractor, probable cost $8,200; Geo. A. Allan, architect. We are also having constructed a complete separate sewer system under the able supervision of Willis Chipman, C. E., which, when completed, will be one of the best, if not the best, of its kind in Canada. Mr. Chipman attends to and strictly enforces the rules and regulations which govern plumbing in Brockville, and which places all plumbing done in this town at the head, as regards safety and durability. I enclose $2, my subscription to the CANADIAN ARCHITECT AND BUILDER up to July, 1889. Trusting that you may have every success in your undertaking, I remain,

Yours truly,

GEO. A. ALLAN.

CANADIAN SOCIETY OF CIVIL ENGINEERS BALLOT LIST.

THE Nominating Committee having recommended the following list of officers and members of Council for the year 1889, the Council now submits the same to ballot:—For President, C. S. Gzowski, Toronto. For Vice-Presidents, E. P. Hannaford, Montreal; H. F. Perley, Ottawa; P. S. Peterson, Montreal. For Treasurer, H. Wallis, Montreal. For Secretary, H. T. Bovey, Montreal. For Librarian, F. Chadwick, Montreal. For Members of Council, G. F. Baillarge, Ottawa, O.; J. D. Barnett, Stratford, O.; St. G. Boswell, Quebec, Q.; T. R. F. Brown, Montreal, Q.; G. C. Cunningham, Sherbrooke, Q.; E. Gilpin, Jr., Bedford, U.S.; F. U. Gisborne, Ottawa, O.; W. J. Jennings, Toronto, O.; G. A. Keefer, Vancouver, B.C.; J. Kennedy, Montreal, Q.; B. D. McConnell, Montreal, Q; M. Murphy, Halifax, N. S.; J. E. Vanier, Montreal, Q.; E. Wragge, Toronto, O.

We regret to learn that certain of the members have issued, in opposition to the "house list," an anonymous list, and seemingly in misunderstanding of the first mentioned list, which provides for the insertion of other names where the voter desires. Mr. Allan Macdougall, who is nominated on the anonymous list, has declared his intention of supporting the house-list, and has made the request to the members that they neither vote for him nor do anything to destroy the existing harmony the Society enjoys.

ST. STEPHEN, N. B., Nov. 23, 1888.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—We have been interested in the articles in your last two issues regarding Canadian and imported sewer pipe. We have no quarrel with the statement made by you in the October number of you paper, as it evidently referred only to vitrified pipe, but would like to call your attention to the fact that we manufacture here a sewer pipe which is second to no vitrified pipe either Canadian or imported, in point of durability, and in some other respects is much superior. Our pipe is not an ordinary cement pipe, but goes through a process of carbonizing which greatly increases its strength and hardness, and makes it nearly like a piece of natural stone. Ours is the only factory of the kind in Canada, and this is only the second season for us; but our pipe is getting now well into the market and making a way for itself. In this town and some neighboring towns, it is exclusively used for both public and private sewers, and it is no mere experiment, as the same article has been used in some parts of the United States for many years, and in some of the large Western cities has entirely supplanted vitrified pipe.

Respectfully yours,

C. N. VROOM & CO.

A French exchange gives us a new plan for deadening floors without loading the planks. Fill the empty parts between the joiner works with liquid lime thickened with chloride of zinc. This will prevent noise, fire, vermin, and the house will be rendered healthy. Workmen using this preparation should wear guarded spectacles, and wash their hands well after the work is completed.

Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work in contemplation, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

LONDON, ONT.—A $1,000 extension to the hospital will be built this fall.

STRATHROY, ONT.—The site for a new post office has been selected.

BRANTFORD, ONT.—The Public School Board has decided to erect two new school buildings.

WINNIPEG, MAN.—A handsome market will probably be erected here, costing between $30,000 and $40,000.

NORWOOD, ONT.—A new church to cost between $15,000 and $20,000 is to be erected here by the Methodists.

BELLEVILLE, ONT.—The Bay Bridge Company is being organized and tenders will soon be asked for the construction of the bridge.

GUELPH, ONT.—A vote will be taken on the 7th of Jan. on a by-law to grant $15,000, for the extension of the water-works system.

OTTAWA, Ont.—The Marine Department asks tenders for the erection of a lighthouse and buildings at Gargantua harbor, north shore of Lake Superior.

CALGARY, N. W. T.—Mr. T. C. Keefer, C. E., Ottawa, is preparing plans for a water works system for this place. It is proposed to adopt the Holly direct pressure system. Work will begin early in the spring.

VANCOUVER, B. C.—It is understood that the sum of $50,000 has been set aside by the directors of the Bank of Montreal, for the erection of a handsome building in this city.—A site for a new Anglican Church has been selected.

TORONTO, ONT.—It has been decided to expend $90,000 in extending the city water-works system.—Tenders are asked until the 21st inst., for the construction of two bridges to cross Dundas street. Particulars from Ald. Carlyle, Chairman Works Committee.—The Ontario Goverement are said to have rejected all tenders for the Upper Canada College new buildings, the lowest being about $80,000 above the appropriation, and that new tenders will shortly be called.

BUILDING REVIEW, 1888.

GALT, ONT.—$172,866 worth of new buildings have been put up this year.

COMBER, ONT.—Building improvements to the amount of $25,000 is claimed.

BLENHEIM, ONT.—Nearly $40,000 were expended in new buildings during last season.

PERTH, ONT.—Building operations during the season just closing amounted to $90,000.

BRANDON, MAN.—$150,000 have been expended in building operations during the past year.

BERLIN, ONT.—$272,825 have been spent during the past season upon 157 new buildings and additions.

ELMIRA, ONT.—This village has enjoyed quite a boom during the past season. $21,850 have been spent in building improvements.

SMITH'S FALLS, ONT.—There has been quite a building boom this year. $165,000 have been spent in building and improvements.

WOODSTOCK, ONT.—During the past year 128 houses were erected and a quarter of a million of dollars spent in building operations. Two-thirds of a mile of flagstone pavement has also been laid.

CARLETON PLACE, ONT.—Building operations during the past season were very brisk. Over $175,000 were spent in the erection of new buildings and improvements to old ones. In all, eighty buildings were put up.

WINDSOR, ONT.—During the past twelve months, buildings have been erected or are in course of erection to the cost of $280,275. The town Council has expended in sewer and other public works $76,500, making a total of $350,075.

MONCTON, N. B.—Over 75 new buildings have been erected here during the past season, at a cost of $87,000. There were also some 20 or 25 erections in additions to buildings, costing about $15,000, making a total amount of $100,000.

WHITBY, ONT.—This has been the liveliest season for some years in the building trade here. Building and rebuilding to the amount of $75,000 is either finished or under way, and the prospects are fair for a continuance next year of the present activity.

PETERBORO', ONT.—Building operations this year amount to over $270,000, and in the village of Ashburnham, about $45,000, making a total for both places of over $315,000, an increase of $100,000 over 1887. The list includes 3 blocks of stores, the Salvation Army temple, two hotels, a woollen factory, and a large number of residences. In addition to these, there is the Nicholls Hospital, in course of erection, the cost of which will be $25,000.

TORONTO, ONT.—The cost of new buildings erected in Toronto during the past year, aggregates in round numbers about $2,000,000, nearly half ($928,000) this sum was spent in the erection of dwellings; stores, $330,000; churches, $220,000; warehouses, $104,000; Gas Company's buildings, $60,000; hotels and clubs, $68,000; city buildings, $161,000; schools, $20,000; elevators, $25,000; stables, etc., $30,000; charitable institutions, $36,000; rinks, $38,000; factories and shops, $42,000.

SUGGESTIONS FOR DECORATORS.

CONCERNING that very essential property in ornamental art, beauty, writes Mr. James Ward, Head Master of the Shcool of Art, Macclesfield, Eng., in the *Painters' Magazine*, it may be said that to lay down any laws or rules for its application in design, would be a very difficult task. It has really so many rules as to be almost past definition, for in nature its prime qualities or very essence appeals to the intellect, and is in a sort of way felt and is quite inexpressible in art, It is, however, generally admitted that the highest form of beauty in ornament consists in the perfection of fitness. For example, you cannot decorate to any extent, if at all, a column of a severe, or indeed any order of architecture (except the head or capital), without weakening the appearance of it. It is already beautiful in its outlines and perfect in design for its position in the building, and wants little or no decoration to make it any more beautiful.

A safe rule to observe in the decoration of almost anything, from a temple or a house to a vase or a coal scuttle, is to take the lesson that nature teaches in the distribution of color and form; she carefully avoids on the plumes of bird's feathers, and on plants, animals, and many other things, any wealth of color or decoratinn on what may be called the working parts; it is the tips of the feathers, the crests and ends of the plumes, the upper surfaces of wings in butterflies, and wing cases in beetles, the spots on the backs of the tigers and leopards and of most fish and shellfish. The tips and upper ends of plants bear their cups, their spikes, and waving plumes of gay flower heads; in short, wherever strength and work reside in nature, you will not find any lavish expenditure of decoration. What beauty it may possess will be the beauty of fitness; the trunk, the stems and the roots of plants. The quill ends of the feathers of birds possess alone the beauty of strength and constructive utility. In unison with these laws the savage carves his weapons of war. He will only carve and decorate the part that does not interfere with his handling of them—he leaves all the working parts plain. It is wrong, therefore, to overload the mouldings and framework of doors and cabinets, or any other constructive parts, with carving or decoration. The part that folds over the edge of the table in an embroidered cloth should be left plain. So in beams, arches, groups of mouldings, or borders around panels, give as much constructive beauty as you like, but otherwise let them be simple in color, or leave them severely alone. It is on the panel or field, such as the ceiling, the wall, the carpet, or hangings that you can be lavish in your decorations, at the same time avoiding anything that would disturb the repose of such surfaces, either in form or color.

The master painter of to-day is said to have control of 15,000 different shades of color.

A strong application of ordinary spirits of camphor will remove almost any kind of polish or varnish; so also will the solution of potash.

A convenient preparation for rebronzing gas fixtures is made by mixing bronze powder with any transparent varnish, say amber, gum damar or copal. Do not mix more than you are going to use at once, because most bronze powders act as powerful dryers, and what you have left of the mixture soon becomes hard and useless. It is best to put a little of the varnish in a small flat saucer and some of the loose powder next to it, and mix with the brush while you are using it, as a painter mixes colors on his palette.

A report of the Toronto Plumbers' banquet, at which speeches were made by Messrs. W. J. Burroughes, J. J. Withrow and others, in favor of the establishment of trade schools, is unavoidably crowded out of this paper.

The sanitary condition of the city of Winnipeg is said to be far from satisfactory. The daily papers charge that the sewers were not flushed once during the past summer, and that lanes, back yards and alleys, cause foul odors to assail the pedestrian at every turn. The Health Department of the city of Winnipeg would seem to be far more ornamental than useful.

Send $2 and receive the "Canadian Architect and Builder" for one year and a copy of the "Canadian Contractor's Hand-Book."

THE SEWERAGE OF SMALL CITIES AND TOWNS.

By Willis Chipman, B.A., C.E.

SEWAGE removal by water carriage has been in use for centuries. When the sewers are designed to carry not only the sewage proper, but the rainfall as well, the system is known as the *combined system*; when the storm water is excluded, the *separate system*; when part of the rainfall is allowed to enter the sewer, the *restricted system*.

From a sanitary standpoint there is no doubt in the mind of the writer that the separate system is one to be preferred. This opinion is based upon the following reasons:

1st. Except in the large cities the conduits can all be made of vitrified glazed pipe, which is impervious to liquids and gases under ordinary pressures and offers a smoother surface than any brick or cement surface.

Brick work is not impervious, and any brick or cement surface presents many small projections which collect matters in suspension, thus impeding the current. Fresh running dilute sewage is not dangerous, not even offensive. Not until it becomes stagnant and putrefaction commences, is it dangerous. The pipe sewer therefore has a great advantage over any brick or cement sewer.

2nd. In the combined system the sewers are made large enough to carry the maximum rainfall, at which time they run full, while the flow of the sewage only is but a small fraction of the rainfall, so small indeed as to be wholly disregarded in designing the sizes of the sewers.

It therefore follows that these large sewers of the combined system cannot be fully flushed, except during a maximum rainfall, perhaps once or twice a year, consequently the sewer air must become foul, especially in the small branch sewers, during the dry seasons, the flow of sewerage proper being but a small, putrid, thickening stream. Only when a sewer becomes offensive is it thought necessary to flush it from a hydrant or tank.

In the separate system the flow in the pipes is comparatively a constant one, the maximum flow being but a few times greater than the minimum flow. To flush the system a flush tank should be placed at the end of every sewer. These tanks work automatically, flushing the sewers copiously with water. They can be controlled to flush as often as necessary, and work in winter or summer, rain or shine. Where the flow of sewage is least the flush is greatest.

As you follow upward the current in the sewers of the combined system the sewer air must become more foul, while in a separate system it becomes less foul.

3rd. In the separate system less ventilation is required, the sewers being less foul, and this ventilation is easier accomplished.

The city engineers of the present day are still at work devising methods of ventilation for their sewers. Everything has been tried, and nothing is quite satisfactory. Ventilation through catch-basins caused nuisances at those points close to the buildings. Ventilation through flues, chimneys, etc., were imperfect, only ventilating the sewer which was connected with the flue. Charcoal filters have been used, sulphurous acid and chlorine gas have been tried, to deodorize the effluvia arising from sewer openings.

Perforated manhole covers are now extensively used and generally recommended as a great aid to ventilation of a combined system of sewers. In Ontario during our four months of snow and ice, perforated manhole covers are next to useless as ventilators, but no doubt this is the least objectionable method of ventilating during the remainder of the year. They should also be used as an aid to ventilation in the separate system.

In the combined system the dangers arising from effluvia from sewer openings are great, and the ingenuity of the health officer and engineer has been taxed to invent traps and ventilating pipes to keep "sewer gas," so-called, from finding an entrance into our houses.

The more pipes and traps any system of house drainage has, the less efficient must the ventilation be. The Public Health Act of 1884, gives a fair sample of one of these most ingenious, cumbrous, expensive and inefficient methods of ventilation.

In the separate system there is little or nothing to guard against, especially in the upper portions of the system, where the flush is frequent and regular, the flow of clean water displacing any foul air that may be formed and forcing it out at places of least resistance. The sewers in this system can therefore be ventilated safely and effectually by the main soil pipes being carried through the buildings and above the roof, without placing anywhere in their courses any trap or obstruction to the free passage of air from or to the sewers. This simple method of ventilation also reduces the cost of house plumbing materially.

4th. In the separate system the cellars and basements have no direct communication with the sewers. If a stoppage should take place in any sewer the sewage "backing up" in sewer would probably gain sufficient head to overcome the obstruction, or would flow out on surface from some manhole before finding an entrance into any building through any fixture. This is an important matter and one seldom considered. In the combined system generally a drain leads from the cellar or basement to the street sewer, often of sufficient size to convey the sewage of a town of 5,000 people. This pipe or drain has a filth reservoir placed in its course called a trap, supposed to keep out gases from the sewer. During the summer months the water in this trap is probably evaporated and the sewer air has free, uninterrupted passage into the building. During storms the sudden flushing of sewer may force the trap. A trap on a cellar drain can never be depended on.

In the separate system cellar drainage is provided for by laying porous agricultural drain tile from the building to the street sewer, and alongside the street sewer is laid a line of agricultural tile drain which carries subsoil and cellar water only. The water in these drain tiles being clean can be given an outlet at the surface either into existing deep drains or into a natural water course

These drain tiles will lower the subsoil water, an important matter in our climate, where in the winter season the heat in the interior of our houses tends to draw in the damp ground air.

5th. Where the disposal of sewage by pumping, irrigation, precipitation or filtration is necessary the separate system has every advantage over the combined system, owing to the small volume to be considered.

COST.

In the family the child naturally tends to imitate the parent or elder children, whether for good or for evil. In the same way a small city or town contemplating sewerage looks to the larger cities for a model. When they find these large cities expending on their costly subterranean water courses, which they call sewers, sums that would deter a smaller corporation, it is not surprising that these smaller places postpone the construction of a system of sewerage.

It is a great mistake to look to the larger cities for model sewerage. Within the last twenty, within the last ten years, even within the last five years, sanitary engineering has taken gigantic strides, and the best, safest, and cheapest systems of sewerage are those that have been commenced and completed in the smaller cities within the last five years.

In the United States the following towns and cities have constructed sewerage systems since 1880—adopting in each case the separate system: Memphis, Tenn.; Keene, N. H.; Norfolk, Va.; Pullman, Ill.; Stamford, Conn.: Chelsea, Mass., (in part); Kalamazoo, Mich.; Omaha, Neb., (in part); Little Rock, Ark.; Birmingham, Ala.; Pittsfield, Mass.: Leavenworth, Kan.; Schenectady, N. Y.; Amsterdam, N. Y.; Green Island, N. Y.; West Troy, N. Y.

In Canada the town of Brockville is now constructing a complete system of sewers, and the town of Cornwall has made a commencement. Both of the towns have also adopted the separate system.

In the small cities, towns and villages the element of cost is often a controlling factor. The writer has given his reasons why he considers the separate system better than the combined system from a sanitary standpoint, and as a system of sewers designed to carry the rainfall will cost from twice to five times as much as a system to carry sewage only, there are few valid reasons for adopting a combined system.

It is often objected against the separate system that additional sewers are necessary to carry the rainfall. This may be true in large cities with large roof area, paved courts and streets, where storm water would do injury if not immediately carried off, but in the majority of towns and cities in Ontario the surface gutters and present drains are quite sufficient to carry the rainfall. In special cases it may be advisable to allow a limited amount of roof water, or even street water in the sewers; all depends upon local conditions.

In moderate earth excavation the average cost of a completed system of sewers built on the separate system should not exceed $1.50 per lineal foot of sewer constructed. This is a sum that any town not already bankrupt, can afford, being at the rate of $7,500 per mile approximately.

In the system of sewerage designed for the town of Cornwall by the writer, any sewage entering the system at the greatest distances from the outlet will be discharged in less than ninety minutes. In the Brockville system, now under construction, the time required to discharge at the main outlet from buildings farthest removed from the outlet along the line of sewer is also less than ninety minutes. The main outlet at Brockville is a submerged iron pipe 923 feet long extending from short line out into the River St. Lawrence, the outer end being in 45 feet of water.

PLUMBING.

It is a fact well understood among sanitary engineers that the greater amount of the dangerous sewer air that invades our dwellings is "home-made"—manufactured on the premises—that is, it comes from putrescent matter lodged in the traps, pipes and fixtures in the building itself. It is human nature to remove the cause of a wrong as far as possible, and there is but little doubt that the public street sewer, built by a conscienceless corporation, is blamed for many foul emanations that come from defective plumbing.

The science of plumbing, depending as it does upon a knowledge of some of the laws of physics, hydrostatics, hydraulics and pneumatics, is but little understood by the average citizen, and the ordinary plumber has not kept pace with the requirements of his calling during the last decade of advancement and improvement.

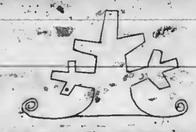
For these reasons all plumbing should therefore be under the control and supervision of the city or town engineer.

In conclusion, the writer is of the opinion that the time has arrived when those *twenty relics of ignorance and barbarism*, the "privy vault" and "cesspool," should be abolished in all cities and towns and some system of direct removal substituted temporarily until a complete system of removal by water carriage is constructed. These nuisances are only tolerated from familiarity, and should be stamped out by sanitary officers totally out of reach of local prejudice or political influence.

A CANADIAN PLUMBER ABROAD.

THE following extract from a letter written by a young Canadian plumber now working in England, to a friend in the same line of business in Toronto, has been handed to the CANADIAN ARCHITECT AND BUILDER for publication, on the idea that it may be instructive to some of our readers:

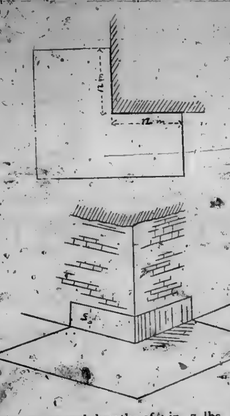
"You will see from the changed address that I have removed since I last wrote you. I came down to — in April and have been busy ever since, for — —, No. —, Fulham Road, London. When I came here, he saw a piece of lead work in their window, which he thought could not possibly be "bossed"; but it was, and they have a still more wonderful piece which took two weeks to work out, and during that time many plumbers, builders, reporters, etc., availed themselves of the opportunity of watching the process. It looks something like the accompanying design and is worked entirely out of one piece of sheet lead, the remainder of which is rolled up as per sketch. I think it was 30 feet



long by 3 ft. 6 in. wide. Since coming down here I have run two 20 ft. stacks of lead soil-pipe, and one 30 ft. stack, and in two cases had rather difficult bending to do, but got over it creditably, and think I may now call myself a decent workman. I have had two plumbers working subject to my instructions part of the summer, but have only one now. I am in hopes of getting the job to line two cisterns of 2,000 gallons capacity each, with lead, at the baths. I can now, with my mate, make a 4 inch lead bend as cheaply as I can buy a stock Dubois ditto, and guarantee the back of bend to be thicker than any normal part of the pipe used; and by taking more time could make the back twice as thick as the throat, and not use a bit of solder in either case, but simply bend them with aid of bobbins, dummies, dresser, etc. I do not mean that I am more clever than other London plumbers, as many could do what I have spoken of, but many could not. In a discussion about a 4 inch Strap, at —— & ——, I once heard someone say it would be impossible to make one out of pipe as described, but now I believe it could be done. The same man that made the before mentioned piece of sheet-lead work, also made a 4 inch bend as follows:

And if that can be done, I do not see why he could not make a 4 inch trap. If you look in the *Plumber & Decorator* for September, page 428, you will see my name in connection with Exams. I got a first-class certificate in elementary grade in 1887, and I expect that will give me a second class honors certificate. Could not attend practical Exam, for 1888, and I failed in 1887 because after the "bossing" was finished, I had only half an hour left for wiping, so gave up. Although I made a decent job of the "bossing" I really think it was too difficult, as if worked out to the letter, it would be extremely difficult even for an old "bosser." We were only allowed 2 ft. 6 in. squares of lead ready cut, and you will notice from the enclosed slip, there is only just enough lead in area to make the break and a little must be cut from the corner to start working from:

"1. Boss up a break in a piece of 7 lbs. lead, 2 ft. 6 in. by 2 ft. 6 in., suitable for fixing against the angle of a square chimney, as shown in following sketches:



2. Join two 12-inch lengths of 4 in. 7 lbs. lead pipe by an underhand wiped soldered joint, the pipes being fixed at an inclination of about three inches in 1 foot, and the lowest end 3 inches above the floor.

3. Join two 12-inch lengths of ½-inch lead pipe by an underhand wiped soldered joint."

Four hours were allowed for the above test.

New experiments in lighting cars by electricity are being tried by the Erie railroad, and trial trips of cars equipped with a new system are now being run from Jersey City to Buffalo. The system used is known as the Camille-Faure system of storing electricity. Six crates of twenty-three candle battery, each sixteen inches square, and containing a layer of twelve negative and eleven positive plates, are filled with acid, and four hours is occupied in charging them with a dynamo. Cars 375 and 379 are being lighted in this way and run through to Buffalo and return on the night express, sufficient power being furnished by the crates to give light during the eighteen hours it takes to make the round trip.

THICKNESS OF SEWER PIPE.

IN the opinion of Mr. Chas. Rust, C. E., of the Toronto City Engineer's department, the thickness required for 12, 15 and 18 inch sewer pipe, should be one-twelfth of the diameter. The American pipe at present in use in Toronto is hardly up to this standard. Scotch and English pipe is of the thickness mentioned. The thickness of 6 and 9 inch pipe, Mr. Rust thinks, should be ¾ and ⅝ respectively.

The Vancouver, (B. C.) Lime Co., have just put in operation the largest lime kilns on the Pacific Coast, with a daily capacity of 150 barrels.

Mr. T. J. Heard, of London, Ont., has purchased the necessary machinery and intends cutting the stone instead of importing it. The breaking of the marble combine has tended to make this possible.

J. H. Eveleth, of Greenville, Me., is reported to be plastering his house with mortar, in which spruce sawdust takes the place of sand. It adheres well to the lath, and promises to be a success in the way of utilizing a material which has hitherto been wasted.

See list of contents of "Canadian Contractor's Hand-Book" in advertising columns.

SEWER PIPE MANUFACTURING IN CANADA.

Editor Canadian Architect and Builder.

Sir,—On reading the October number of your valuable paper, I noticed your paragraph anent a letter received by you from an American gentleman who has in contemplation the establishment in Canada of a sewer tile manufactory, and before doing so, wants to get certain information respecting the market for those articles, production and demand, etc., etc., and says further that he understands that the largest size at present manufactured in Canada is six inch. You made enquiries in order to give your correspondent the required information, and I now beg a small space in your paper to supplement the same.

The only sewer pipe manufactory in the Province of Quebec, is in St. Johns, P. Q. It is known and operated as the Standard Drain Pipe Co. The capital is presently $50,000, and application is to be made at the coming session of the Legislature to increase it to $150,000. The demand is far ahead of the production, and it is the intention of the present company to extend their buildings and kilns so as to cope with the large demand for goods in their line. They manufacture sewer tiles of 4, 6, 9, 12, 15 and 18 inch diameter, also syphon bends, cesspools, traps, culvert pipes, chimney pipes, etc., etc., and their goods can sustain the comparison with any foreign ones, as the following certificate will show:

"Montreal Sanitary Association,
"10th May, 1888.

"To the Manager of the Standard Drain Pipe Co., St. Johns, P.Q.

"Dear Sir: I have pleasure in testifying that I have tested specimens of your vitrified drain, both as regards crushing strength and freedom from kiln cracks and other defects, and found them highly satisfactory in these respects.

"A drain consisting of eight lengths of straight pipe and three junction pieces, was submitted to the crucial smoke test, which the pipes withstood in a most satisfactory manner; while a second drain of inferior pipes from a Scotch factory, when submitted to the same test, showed numerous defects in the pipes, through which the smoke escaped in large quantities.

I am sir, yours very truly,
(Signed) Richard O. Fleming,
M. Can. Soc. C. Engineers.

This is conclusive evidence, Mr. Editor, of the quality of the goods made here, and the comparison they can bear with imported ones. If the city of Toronto refused the right of using the native article and a dealer had to import over 200 car loads of foreign goods last year, I must say that it is a peculiar whim, considering that the city of Montreal takes for municipal requirements all the tiles, etc., from here, and every contractor of any importance from Montreal orders here, besides all the orders coming from all parts of Canada, the result being as I said before, the increase in capital and capacity being sought for by the Standard Drain Pipe Co.

My aim, Mr. Editor, is in unison with yours, viz., "A duty to encourage the establishment in Canada of manufactures whenever there appears to be a profitable opening for the same," but my duty is more particularly limited to my town, known as the "pottery town" of Canada, where two large chinaware factories are now in full blast, and four more could be started on short notice. And now that this sewer pipe industry is an assured success, why not concentrate this business in St. Johns? where the soil in a certain part of its limits is most propitious, the clay found being utilized to a large extent, a small proportion only of imported clay being required; where the facilities of transportation are unequalled, being intersected by the two largest railway corporations in Canada, viz., the Grand Trunk and Canadian Pacific railways; where the water communications are unsurpassed, thereby, during the season of navigation, reducing the cost in freight rates; where labor is plenty and cheap, land also; and finally, where the municipal council exempts from taxes for 10 years all industries coming within the limits of the town.

I am, sir,
Yours very truly,
Chas. Arpin,
Pro Mayor, St. Johns.

CANADIAN VS. IMPORTED SEWER PIPE.

St. Johns, P. Q., Nov. 23rd, 1888.

Editor Canadian Architect and Builder.

Dear Sir,—I have read the correspondence in your November issue respecting Canadian versus Imported Sewer Pipes. There are three opinions expressed, (by engineers of Ottawa, Kingston, and Montreal,) which only could have reference to St. Johns pipes, as they are within competing radius of our works.

As regards Montreal, our pipes are accepted on their merits, but in Ottawa the city engineer states that the corporation "does not permit any other brand than Scotch," *i.e.* boycotts home manufactures without reference to quality. In this decision there is; no doubt, included local influence and prejudice, as with a fair opportunity and prejudice aside, we could prove that we can supply a better and stronger pipe than the pipe now being used there, which is under the standard of thickness, and is not salt glazed throughout.

As regards Kingston, I am informed that the tender was not open to public competition, and we were not allowed the privilege of tendering. If we had been, we should have been able to satisfy the corporation as to quality.

It is a regrettable fact that, as a rule, Canadians are too apt to ignore home manufactured goods. This feeling we have had to combat, and it has been an obstacle in our way. So long as a

pipe is called "Scotch," it will pass, no matter how inferior in quality—in fact, the magic name of "Scotch" renders it unnecessary to inspect the pipe. Scotch pipes are being largely used in Toronto this year, and are to be seen at most street corners. I would ask you or any of your readers to examine the first batch of these pipes that you see. The outside of the pipe is salt glazed undoubtedly, but how about the inside? In the case of perhaps 50 per cent., the glaze inside the pipe is put on with a sponge or a brush, and great care is not taken to cover the whole surface and the glaze is streaked on. I don't say what that glaze is, whether varnish, paint, or a slip, but I do say *it is not salt glaze*, because salt glaze is not put on with a brush or a sponge, but is the chemical action of chloride of sodium (in a volatilized condition) on the silicate and alumina contained in the clay, and the pipes are subjected to this process when at a temperature of about 2,700° Fahr.

The inference is, that these pipes are not first quality, but that the exigencies of competition against the growing industry in this country, has made it necessary for dealers to buy a cheap pipe; and this idea is borne out by the fact that importers of Scotch pipes are entering them at customs at the following prices:—4 inch pipes per yard, 4d.; 8 inch, 6d.; 9 inch, 9d.; 12 inch, 1s. Is it reasonable to suppose that a good article could be delivered from 10 to 15 miles from the works, alongside ship in Glasgow at these figures?

The facilities for manufacturing on the Ohio River are equal or superior to Scotland, but in face of the severe competition in the United States, the prices are at 80 per cent. off the list:—4 inch, 12c. = 6d.; 6 inch, 18c. = 9d.; 9 inch, 33c. = 1s. 4½d.; 12 inch, 51c. = 2s. 1½d., = from 50 to 100 per cent. higher than Scotch.

I consider the Ohio pipe far superior to the Scotch, being well glazed and of a denser body, and better calculated to resist absorption and the action of acids, but they are not up to the standard of thickness—in fact, they are in some sizes 25 per cent. below it. This is probably occasioned by the necessity of saving freight in shipment, but the standard—*1 inch in thickness to 12 inches in diameter*, is quite thin enough to bear the superincumbent weight of earth, and should be insisted upon by engineers.

Scotch pipes of some brands do not come up to the standard of thickness, and the change to a lighter pipe has been noticeable during the last three years, the same object being in view, viz., to lessen the freight at the expense of utility.

In reference to the pipe made at St. Johns, we would say, that it is the strongest pipe in the market, well glazed, of dense body, and thoroughly vitrified, and we think we cannot offer a fairer way of settling the question of their being equal or superior to any pipe imported into Canada, than by offering to meet in open and public competition, any other brand—the pipes to be tested by any means suggested by an engineer named by us, and one named by the representative of any imported brand, said two engineers nominating a third. All the writing in the world would not remove the inborn prejudice in some men's minds, but an ocular demonstrati[illegible] might, and we invite all importers to take up this challenge, which we will attend to very promptly.

Yours very truly,

W. C. TROTTER,
President.

The Standard Drain Pipe Co.,
of St. Johns, P. Q. (Lim.)

Notice to Contractors.

TENDERS will be received, by registered post, addressed to the Chairman of the Committee of Works up to 2 o'clock p. m. of the 21st day of December, 1888, for the construction of the

DUNDAS-STREET BRIDGES,

Both Masonry and Steel Superstructure.

Specifications, plans and forms of tender, can be obtained at the City Engineer's Office, on and after the 10th inst. A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 2½ per cent. on the value of the work tendered for, must accompany each and every tender, otherwise it will not be entertained. All tenders must bear the bona fide signatures of the contractors or contractor, and their or his sureties, (see specification) or they or he will be ruled out as informal. The Committee does not bind itself to accept the lowest or any tender.

(Signed), WM. CARLYLE,
Chairman Committee on Works.

Committee Room,
Toronto, Dec. 1st, 1888.

BUILDING MATERIALS.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins..	$30 00@	32 00
1¼ and thicker, three uppers, Am ins.		37 00
1¼ and thicker, pickings, Am ins.....		27 00
1 x 10 and 12 dressing and better......	20 00	22 00
1 x 10 and 12 mill run..............	15 00	16 00
1 x 10 and 12 dressing.............	15 00	16 00
1 x 10 and 12 common..............	12 00	13 00
1 x 10 and 12 spruce culls...........	10 00	11 00
1 x 10 and 12 maple culls..........		9 00
1 inch clear and picks.............	23 00	25 00
1 inch dressing and better.........	18 00	20 00
1 inch siding, mill run.............	13 00	15 00
1 inch siding, common..............	12 00	13 00
1 inch siding, ship culls..........	10 00	11 00
1 inch siding, mill culls..........	8 00	9 00
Cull scantling....................	8 00	9 00
1¼ and thicker cutting up plank......	22 00	25 00
1 inch strips, 4 in. to 8 in. mill run....	14 00	16 00
1 inch strips, common..............	11 00	12 00
1¼ inch flooring..................		15 00
1½ inch flooring..................		16 00
XXX shingles, sawn................	$2 40@	2 50
XX shingles, sawn.................	1 30	1 50
Eastlake painted iron shingles, per square, (10 feet)		4 50
Eastlake painted tin shingles, per square.................		4 50
Eastlake genuine galvanized iron shingles, per square................		7 00
Imitation brick siding, per square.....		3 50
Special siding, per square..........		3 50
Lath, sawn......................		1 80

YARD QUOTATIONS.

Mill cull boards and scantling........		10 00
Shipping cull boards, promiscuous widths.................		12 00
Shipping cull boards, stocks........		13 00
Scantling and joist, up to 16 ft.......		14 00
" " 18 ft.......		15 00
" " 20 ft.......		16 00
" " 22 ft.......		17 00
" " 24 ft.......		19 00
" " 26 ft.......		20 00
" " 28 ft.......		22 00
" " 30 ft.......		24 00
" " 32 ft.......		26 00
" " 34 ft.......		28 50
" " 36 ft.......		30 00
" " 38 ft.......		32 00
" " 40 to 44 ft..		35 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board,	18 00	20 00
Dressing stocks..................	16 00	18 00
Picks, American inspection..........		40 00
Three uppers, American inspection....		50 00
Cedar for block paving, per cord......		5 00
Cedar for Kerbing, 4 x 14, per M....		12 00

B. M.

1½ inch flooring, pressed............	25 09	30 00
1½ inch flooring rough..............	14 00	15 00
1¼ " dressed............	23 09	25 00
" undressed..........		14 00
" dressed............	16 00	20 00
" undressed..........	12 00	14 00
Beaded sheeting, dressed............	18 00	20 00
Clapboarding, dressed...............		12 00
XXX sawn shingles, per M...........	2 75	2 00
Sawn lath.........................		2 25
Red oak..........................	20 00	25 00
White............................	25 00	30 00
Basswood, No. 1 and 2.............	18 00	20 00
Cherry, No. 1 and 2................	50 00	60 00
White ash, No. 1 and 2.............	25 00	25 00
Black ash, No. 1 and 2..............	20 00	30 00

HARDWARE.

Cut Nails:

American Pattern, 1¼ inch, per keg....	4 35
" " 1½ to 1¾ inch, per keg	3 60
Canadian Pattern, 1¼ inch, per keg...	3 85
" " 1½ to 1¾ inch, per keg	3 25
" " 2 to 2¼ inch, "	3 35
" " 2½ to 2¾ inch, "	3 10
" " 3 inch and larger......	2 85
Steel nails 10c. per keg extra.	
Finishing nails, 1 inch, per keg........	6 05
" " 1¼ inch, "	5 30
" " 1½ " "	5 05

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey..	40
" " " White	60
Plaster, Calcined, New Brunswick..	2 20
" " Nova Scotia......	2 10
Hair, Plasterers', per bag..........	1 00
Cement, Portland, per bbl...........	3 00
" Thorold, "	1 50
" Queenston, "	1 50

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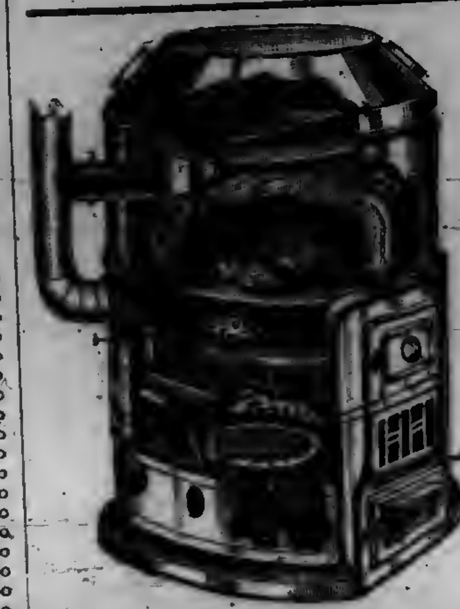

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